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Asst. Prof. Dr. Hande CENGİZ AÇIL
Prof. Dr. Dilek AYGİN

NURSING APPROACHES IN HEALTH SCIENCES: CLINICAL PRACTICES, TECHNOLOGY, AND CARE PROCESSES

BZT TURAN

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Dr. Öğr. Üyesi Hande CENGİZ AÇIL, lisans eğitimini 2009 yılında Sakarya Üniversitesi Sağlık Yüksekokulu'nda, Yüksek lisansını İstanbul Üniversitesi Sağlık Bilimleri Enstitüsü Cerrahi Hastalıkları Hemşireliği Anabilim Dalı'nda, doktora eğitimini ise 2018 yılında Sakarya Üniversitesi Sağlık Bilimleri Enstitüsü Hemşirelik Anabilim Dalı'nda tamamlamıştır.

Sakarya Üniversitesi Sağlık Bilimleri Fakültesi Cerrahi Hastalıkları Hemşireliği Anabilim Dalı'nda 2013 yılından beri akademisyen olarak görev yapan Dr. Cengiz Açıl, 2020 yılında Dr. Öğretim Üyesi unvanını almıştır. Cerrahi hemşireliği, meme kanseri hemşireliği ve ameliyathane hemşireliği alanlarında uzmanlaşan Dr. Cengiz Açıl'ın ulusal ve uluslararası hakemli dergilerde yayımlanmış çok sayıda makalesi, uluslararası ve ulusal kongrelerde sunulmuş bildirileri ile akademik kitap bölümleri bulunmaktadır. Ayrıca, lisansüstü düzeyde yüksek lisans ve doktora öğrencilerinin tez danışmanlığını başarıyla yürütmektedir.

2013 yılından itibaren çeşitli idari görevlerde bulunan Dr. Açıl, 2020 yılından itibaren Sakarya Üniversitesi Sağlık Bilimleri Fakültesi Dekan Yardımcılığı görevini sürdürmekte olup aynı zamanda 2025 yılı itibarıyla Sakarya Üniversitesi Geleneksel ve Tamamlayıcı Tıp Uygulama ve Araştırma Merkezi Müdürlüğü görevini yürütmektedir. Akademik çalışmaları ve üstün başarıları ile Dr. Cengiz Açıl, Sakarya Üniversitesi tarafından 2019 yılında Genç Bilim İnsanı kategorisinde Sağlık Bilimleri Alanında Ödüle, 2022 yılında Eğitim-Öğretim ve Uluslararası Etki alanlarında iki ayrı ödüle, 2023 yılında Eğitim-Öğretim alanında ödüle layık görülmüştür. Evli ve iki çocuk annesi olan Dr. Hande CENGİZ AÇIL, akademik ve idari çalışmalarını büyük bir özveriyle sürdürmekte ve hemşirelik biliminin gelişimine önemli katkılar sağlamaya devam etmektedir.

İstanbul Üniversitesi Florence Nightingale Hemşirelik Yüksekokulu'ndan 1991 yılında mezun oldu. 1994'te İstanbul Üniversitesi Sağlık Bilimleri Enstitüsü Cerrahi Hastalıkları Hemşireliği Anabilim Dalı'nda Yüksek Lisansını, 2005 yılında Marmara Üniversitesi Sağlık Bilimleri Enstitüsü Cerrahi Hastalıkları Hemşireliği Anabilim Dalı'nda doktorasını tamamladı. 1991-1994 yılları arasında İstanbul Üniversitesi Tıp Fakültesi Anesteziyoloji ve Reanimasyon ABD'nda hemşire olarak görev yaptı. 1994 yılından bu yana Sakarya Üniversitesi'nde hizmet vermektedir. Cerrahi Hastalıkları Hemşireliği alanında 2013 yılında Doçentlik ve 2019 yılında Profesörlük ünvanını aldı. Halen Sağlık Bilimleri Fakültesi Dekanı olarak görevini sürdürmektedir. Dış kaynaklı ve BAP projelerinde yürütücü ve araştırmacı olarak yer almıştır. Bunlardan bir tanesi Sakarya Üniversitesi Rektörlüğü adına Proje Yürütücülüğünü yaptığı, 2016 yılında Avrupa Birliği tarafından finanse edilen "VAW/56- Güvenli Bir Hayat Var!/There Is A Safe Life!" projesidir.

Cerrahi hemşireliği, onkoloji hemşireliği, meme kanseri hemşireliği, cinsellik, yoğun bakım hemşireliği alanlarında uzmanlaşmıştır. Uluslararası ve ulusal çok sayıda yayını, kitap bölümleri, kitapları, projeleri ve ödülleri bulunmaktadır. Çok sayıda yüksek lisans ve doktora mezunu veren Aygin yüksek lisans ve doktora danışmanlıklarına devam etmektedir. Ödüllerinden bazıları; 2011 ve 2013 yıllarında Sakarya Üniversitesi Ödül Değerlendirme Üst Kurulu tarafından Bilimsel Yayın Ödülü ve Sağlık Bilimleri Alanında Ödül verilmiştir. Sakarya Üniversitesi Bilim, Sanat ve Genç Bilim İnsanı Ödülleri Yürütme Komitesince, 2019 Yılında Dönemsel Başarı Ödülleri kategorisinde Sağlık Bilimleri Alanında Birincilik Ödülü, 2020 yılında da Bilim/Sanat Ödülleri kategorisinde Sağlık Bilimleri Alanında İkincilik Ödülü almaya hak kazanmıştır. 2023 yılında "Lenfödem Ölçüm Cihazı" Faydalı Model Patenti almıştır. Evli ve iki çocuk annesidir.

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CHAPTER 1

ANALYSIS OF FORENSIC CASES REFERRED TO THE EMERGENCY DEPARTMENT AS OUTPATIENTS

Ayşe Şule AKAN[1]

ABSTRACT

Objective: Forensic cases are quite high among the patients admitted to the emergency department. This study aimed to determine the demographic characteristics of forensic cases applying to the emergency department and the ratio of the number of routine assault and battery examination to the cases.

Method: A total of 17,954 patients evaluated as outpatient forensic cases in our hospital's emergency department were included in the study. Cases between March 1, 2024 and February 28, 2025 were retrospectively analyzed in terms of age, gender, diagnosis and time of presentation. Patient information was obtained retrospectively from emergency department patient records, hospital electronic data system, and forensic medicine reports.

Findings: The rate of legal cases among all cases was 3.6%. 77.5% of the cases were male. The average age of the patients was 30.5±18.97 years. 22.6% of the cases were assault and battery examination. Traffic accidents, occupational accidents were frequently seen afterwards. Among these, 2,928 were female, comprising 16.3% of all patients admitted to the forensic unit.

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Conclusion: The highest rate among forensic cases seen in the emergency room belongs to assault and battery examination. Unfortunately, the number of incidents involving violence against women in our country continues to rise. Serious measures need to be taken to prevent this issue.

Keywords: Emergency Departmant, Forensic Case, Forensic Report

Introduction

Forensic cases are quite high among the patients admitted to the emergency department. These patients are cared for in forensic units in hospitals with forensic units and in trauma areas in hospitals without forensic units (Turkcuer et al., 2010). All kinds of events that occur due to external factors, disrupt the physical and mental health of the person and even cause death are considered as forensic cases. The physician is responsible for reporting these cases to the judicial authorities (Yavuz et al., 2003), (Alpaslan and Baykan, 2025). Forensic cases admitted to emergency departments include cases of assault and battery, occupational accidents, suicide attempts, traffic accidents, drowning, gunshot wounds, self-harm, piercing and cutting injuries, drug and recreational substance use, sexual abuse, electric shock, and poisoning (Tümer et al., 2010).

Materials and Methods

17,954 consecutive patients who applied to the forensic case unit of the emergency department, which provides 24/7 service in Erzurum City Hospital, between 1 March 2024 and 28 February 2025 were retrospectively examined in terms of age, gender, diagnosis and arrival times. All paediatric and pregnant patients presenting to the forensic case unit as outpatients were included in the study. All patients brought to the emergency department by ambulance as forensic cases were excluded from the study.

Results

A total of 486,219 patients applied to the Emergency Department of Erzurum City Hospital during this period. Of all patients, 17,954 were examined in the forensic case unit as outpatient applications. The ratio of patients who applied to the forensic unit to the total number of patients admitted to the emergency department is 3.6%. Among these patients, 13,922 (77.5%) were male, with ages ranging from 0 to 96. A total of 4,032 patients (22.4%) were female, with ages ranging from 0 to 98. The average age of the patients was 30.5±18.97 years. The most common time of application was

between 8:00 PM and 12:00 AM. During this time period, 5,989 patients were examined, corresponding to 33% of all trauma patients seen.The most frequent reason for application to the forensic unit was assault and battery examination. According to the ICD-10 diagnosis codes, this diagnosis is defined as "W51- Assault by bodily force." This was followed by traffic accidents and occupational accidents. A total of 4,061 patients applied with a diagnosis of assault and battery, accounting for 22.6% of all patients. Among these, 2,928 were female, comprising 16.3% of all patients admitted to the forensic unit.

Discussion

Forensic cases constitute a significant portion of patients admitted to emergency departments. Patients suspected of being forensic cases must be reported to the hospital police after receiving medical treatment. This reporting is the responsibility of the physician. In our study, it was found that 3.6% of patients who presented to the emergency department were forensic cases. Similarly, in a study conducted by Alpaslan et al., it was reported that 4.6% of emergency department patients were forensic cases (Alpaslan and Baykan, 2025). In the study conducted by Küçük et al., the rate of forensic cases was reported as 2.1% (Küçük and Günel, 2016). In terms of average age, the literature reports the following: Korkmaz et al. 32.41±17.83, Küçük et al. 31.94, Kuş et al. 39.6±7.7 and Seviner et al. 33.75±1.24 (Korkmaz et al.,2012), (Küçük and Günel, 2016), (Kuş et al., 2023), (Seviner et al., 2013). As in most of the literature, our study also showed that forensic cases fall within a similar age range.In their study, Küçük et al. stated that the most common forensic cases in the emergency department were assaults and traffic accidents (Küçük and Günel, 2016). Alpaslan et al. reported that the most common reasons were assault and battery examinations, followed by traffic and occupational accidents (Alpaslan and Baykan, 2025). In our study, we also observed that the most frequent causes were assault and battery examinations, followed by traffic and occupational accidents.In a study by Karabağ et al., it was reported that the majority of patients who presented due to assault, battery, and traffic accidents were women (Karabağ et al., 2021). Similarly, in our study, most of the patients who applied for assault and battery examinations were women. The high rate of violence against women in our country is particularly evident in emergency departments. Some women try to hide this situation due to secondary reasons or may change their statements, which can pose legal problems for physicians who are obliged to report forensic cases.

Conclusion

The forensic reports prepared after the medical treatment of patients in forensic cases constitute a workload for emergency physicians who already work under intense pressure. In our hospital, an outpatient forensic unit provides services specifically for patients seeking assault and battery reports. In this study, it was observed that a considerable proportion of the forensic cases evaluated in the emergency department consisted of female patients. Unfortunately, the number of incidents involving violence against women in our country continues to rise. Serious measures need to be taken to prevent this issue. It is believed that, through such measures, the number of women applying to forensic units to obtain assault and battery reports will decrease.

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CHAPTER 2

SYMPTOM MANAGEMENT IN END OF LIFE CARE AND THE ROLE OF THE EMERGENCY NURSE

Özge YILMAZ[1]

Asuman ŞENER[2]

Tuğba ÇINARLI[3]

ABSTRACT

End-of-life care aims to alleviate the physical, psychological and spiritual symptoms that individuals face at the end of their lives, to increase comfort and to support a dignified dying process. The most common symptoms in this period include pain, dyspnea, nausea, vomiting, anxiety and delirium. Effective management of symptoms is critical not only to improve the quality of life of the individual, but also to reduce the psychosocial burden of the patient's relatives. The use of evidence-based scales in symptom assessment ensures that clinical decision-making processes are based on objective grounds. Emergency departments are critical contact points for individuals admitted at the end of life. In this context, emergency nurses take an active role in the implementation of the palliative approach; they

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undertake multidimensional tasks such as early diagnosis of symptoms, preparation of appropriate intervention plans, and effective communication with patients and their families. In addition, nurses are also responsible for encouraging patients' participation in decision-making processes and guiding the transition from treatment-based care to comfort-oriented care. This study emphasizes the importance of symptom management in end-of-life care and evaluates the roles of emergency nurses in this process in line with evidence-based literature.

Keywords: End-of-life care, symptom, emergency, nursing, nurse, pain, dyspnea.

INTRODUCTION

Palliative care is an intervention that improves the quality of life of patients and family members who face challenges associated with a life-threatening illness (Versluis et al., 2024). End-of-life care is the time frame in which a person accompanies and is affected by a life-limiting illness (Hui et al., 2014). End-of-life care, which is implemented in the last days or weeks of life, is considered the last stage of palliative care (Aykanat Girgin & Gözen, 2024) and aims to provide care to the individual and mitigate symptoms rather than continuation of life (Tatum & Mills, 2020).

End-of-life care is the care provided by nurses in the last few weeks of life to those patients who are predicted to irreversibly lose their vital functions within a certain period of time (Kocatepe & Kuğuoğlu, 2021; Tosun & Aştı, 2019). Although the end-of-life phase of chronic illnesses can last for months or years, in emergency cases, the end-of-life care phase is regarded as the last time just prior to death (Hui et al., 2014). According to palliative care, dying is an inevitable natural process, just like being born (Erkoç, 2024). The main target of end-of-life care is to ensure a good dying environment for patients (Hendrickson & McCorkle, 2008).

Emergency departments are units that serve individuals with life-threatening conditions associated with illness and injury. In addition, it is seen that more and more care is provided to patients with acute, chronic and terminal conditions requiring end-of-life care implementations in these units, which focus on maintaining the patient's survival, where rapid decisions are made, fast paced and stress levels are at a high level (Çömlekçi, 2024) (Heufel et al., 2025).

According to another perspective, invasive and aggressive treatments are often applied to sustain life in emergency departments, but life-saving

measures may often be inappropriate for patients or may not fully reflect the patient's wishes (Cooper et al., 2018; Yash et al., 2017). According to different views, it is also argued that palliative care and emergency care philosophies are incompatible (Çömlekçi, 2024).

In end-of-life care, pain and symptom management, care management plan, communication, cultural issues, ethics and termination of care are important topics for both patients and family members. Healthcare providers involved in the care of the patient should be aware that these issues may not apply to the patient they are taking care of and should be able to do what is necessary. In terms of the management of the patient's last hours; problem-solving approach to control symptoms, avoiding unnecessary interventions, regular monitoring/review of all medications and symptoms, maintaining effective communication, and providing support for the family and individuals caring for the patient are very important. The end of life is a difficult, exhausting and exhausting process for the patient, family and healthcare personnel (Erkoç, 2024). In end-of-life care, despite facing death, it is aimed to spend the last days of life in a way befitting human dignity and to keep the quality of life at the highest level (Uysal & Durmuş, 2024).

Symptom Management in End of Life Care

Today, increasing aging rates and prolonged death processes have significant impacts on the quality of life of individuals at the end of life (Swearinger, 2025a). The aim of end-of-life care is to respect the person's life while supporting their needs in the dying process (Usta & Set, 2022). The use of evidence-based assessment scales for the effective management of symptoms contributes to the preservation of individuals' independence and self-esteem (Swearinger, 2025a).

Individuals with progressive and life-threatening diseases may experience one or more symptoms at the same time (Tuna et al., 2018). In this process, patients' symptoms should be closely monitored and interventions should be made in accordance with the patient's wishes. In cases where death is inevitable, it should be aimed not only to prolong the remaining life, but also to spend this period with a high quality of life free from pain, suffering, psychological and physical complaints. The concept of good death, which has been discussed frequently in recent years, should be realized more carefully from this perspective (Düzgün et al, 2023). End-of-life care should be implemented compassionately within the framework of an individualized and personalized care plan. The point that should not be forgotten in end-of-

life care is to provide high quality care and to ensure its continuity (Uğur, 2022).

People in the dying process are among the most disadvantaged groups in society and often experience symptoms such as pain, suffering, shortness of breath and sadness. The dying process is a period of unpredictable ups and downs, often with many symptoms and a gradual weakening of the person (Swearinger, 2025b). In this period, the care needed is much more difficult than the care needed in other periods of diseases due to the effect of constantly changing and exacerbating symptoms (Gürkan, 2024). For example, it is observed that 71% of elderly individuals experience pain, 55% shortness of breath and 57% anxiety/sadness at the end of their lives (Lee et al., 2020).

It is important to take universal declarations, ethical principles, professional ethical codes, professional values, human rights and patient rights as the basis for decisions to be taken regarding the end-of-life period. The approach of death occurs with a gradual or permanent deterioration accompanied by increasing symptoms or occurs suddenly during an acute illness period (Aykanat Girgin & Gözen, 2024). Various assessment tools are used for the successful management of symptoms. These tools include standardized tests, questionnaires and scales developed to measure common symptoms such as pain, fatigue, loss of appetite and nausea (Brooks et al., 2020). Incorporating evidence-based symptom assessment scales into existing models of care is a critical step in effectively managing and treating patients' end-of-life symptoms. By providing objective assessment and continuous monitoring of symptoms, these tools facilitate timely diagnosis of patients' symptoms and identification of appropriate treatment strategies. Furthermore, evidence-based assessment scales are crucial in providing a standardized approach (Swearinger, 2025a). The two most common symptoms in end-of-life care in emergency services are pain and breathlessness. Nausea and vomiting, depression, anxiety and delirium are frequently additional symptoms that cause pain in end-of-life patients.

Pain

End-of-life care involves the appropriate management of pain and discomfort symptoms to improve quality of life and help patients say goodbye to life in a comfortable, peaceful and dignified manner (Wang et al., 2025). In end-of-life care, pain is the most common symptom (Kocatepe & Kuğuoğlu, 2021; Düzgün, 2018). The management of pain and suffering is one of the key components of providing quality end-of-life care and plays a critical role in improving quality of life. Among the greatest fears of many

people is to die in pain and suffering, and this fear intensifies in the last few days of life (Swearinger, 2025a).

Pain is one of the most common reasons why emergency department admissions of adult patients (Prachanukool et al., 2023). Pain is caused by the interaction of many factors and needs to be managed with a holistic approach to reduce it. Appropriate and effective care should be provided by paying attention to the palliative and end-of-life care needs of patients (Erkoç, 2024). It should not be forgotten that effective pain management is an indicator of nursing care quality (Dikmen & Ziyai, 2021). It is known that symptoms such as pain/pain and respiratory symptoms increase at the end of life when cognitive decline is most common; this may reduce the likelihood of diagnosis and treatment of symptoms (Campbell et al., 2018).

A detailed information should be obtained about the characteristics of the pain such as location, spread, duration and intensity. Verbal and visual analog scales and facial expression scale can be used in pain assessment. In addition, the Short Pain Inventory, which is widely used in palliative care, can be used to assess the general characteristics of pain and its effect on daily activities. At the same time, palliative care assessment scales such as Edmonton Symptom Diagnostic Scale and Memorial Symptom Diagnostic Scale can be used to assess pain (Büyükyılmaz, 2024). The level of pain intensity should be evaluated routinely using verified tools, specifically including patients who are unconscious. Local established protocols should be improved, tracked and monitored to ensure application consistency and ethical application (Uysal and Durmuş, 2024).

Rarely, palliative sedation therapy may be preferred to provide deep sedation when pharmacologic and nonpharmacologic treatments are not sufficient to reduce pain and suffering in end-of-life care (Kocatepe & Kuğuoğlu, 2021). In cases where sedation is considered, a fundamental question is how to decide when one or more symptoms should be considered ‘resistant’ (Thomas et al., 2024).

Palliative sedation is recognized as a last resort for end-of-life symptoms that are resistant to standard treatments and the patient remains distressed despite all symptom relief attempts. Palliative sedation is recognised as an ethically robust approach to end-of-life care. The intention is to reduce persistent suffering, not precipitate death, and should not to be confused with doctor-assisted dying or euthanasia. Palliative care services can ease the distress caused by symptoms and can improve the quality of life of patients who are approaching the end of life. Palliative sedation to the point of loss of consciousness should be a therapy of last resorts when the distressing

symptoms are not manageable. Sedation may prevent the patient from talking to their family, saying goodbye and expressing their last wishes. Therefore, the patient should be given the opportunity to talk to his/her family before sedation is started (Uysal & Durmuş, 2024).

Dyspnea

Regardless of the diagnosis, there is a marked increase in respiratory problems in the last weeks of patients' lives (Campbell et al., 2018). This situation causes serious discomfort not only physically but also psychologically and emotionally. Therefore, it is of great importance to manage dyspnea effectively in the end-of-life care process (Swearinger, 2025a).

Dyspnea is a subjective respiratory distress frequently encountered at the end of life, which the patient defines as inability to breathe or inadequate breathing (Prachanukool et al., 2023). This condition is also called "terminal dyspnea" in the literature (Çam, 2024). Dyspnea causes not only physical but also psychological distress and can trigger emotional states such as fear of death, anxiety and panic (Özdaş & Dönmez, 2023).

Dyspnea, one of the most common causes of emergency department admissions, is often associated with serious chronic diseases such as cancer, chronic obstructive pulmonary disease (COPD), congestive heart failure and stroke. Therefore, it is important to diagnose dyspnea quickly and accurately. In the diagnostic process, not only oxygen saturation data but also other clinical signs such as the patient's facial expression, difficulty in speaking, use of auxiliary respiratory muscles, arterial blood gas analysis and lung auscultation findings should be taken into account. Opioids are the main agents of choice in the pharmacologic management of dyspnea. Low dose opioid therapy initiated on physician order is effective in reducing the severity of dyspnea. In addition, oxygen support may also help alleviate symptoms in patients deemed necessary (Çömlekçi, 2024).

Since dyspnea is a subjective symptom, the patient's own experience should be taken as a basis in the evaluation process; whether the patient experiences dyspnea, and if so, its frequency and severity should be questioned. In this process, multidimensional measurement tools such as the Edmonton Symptom Assessment Scale (ESAS) can be used in addition to unidimensional assessment tools such as the Visual Analog Scale (VAS), Numerical Rating Scale (NRS), Modified Borg Scale and Verbal Rating Scale (VDS) (Çam, 2024).

Especially in patients with hypoxemic respiratory failure, high-flow oxygen therapy and non-invasive ventilation may be beneficial. However, the effectiveness of such interventions is limited in advanced stage patients with reduced life expectancy, and providing symptom control with pharmacologic and nonpharmacologic methods becomes a higher priority (Çam, 2024).

Nausea and Vomiting

Nausea is a subjective experience and is characterized as the sensation that immediately precedes vomiting. Patients report feeling as if vomiting is imminent or they describe the sensation as nausea. Vomiting, on the contrary, is a highly -specific physical event defined as the rapid and vigorous evacuation of stomach contents from the stomach into the mouth and back out of the mouth (Glare et al., 2011). At the end of life, patients suffer from nausea due to many factors (Çam, 2024). Nausea and vomiting is an essential problem seen in end-of-life care patients (Küçük et al., 2022). If not controlled, it may cause physiologic effects such as dehydration, lack of appetite, weight loss, fluid-electrolyte imbalance, loss of appetite, and problems during absorption or excretion of drugs (Tarakçıoğlu Çelik, 2016). When evaluating nausea and vomiting, the patient's expression is important as well as clinical observation. The patient's meal intake, content, quantity, frequency, characteristics and fluid intake are also assessed. Oral hygiene is ensured by providing appropriate oral care (Akpulat & Özger, 2023).

Anxiety

Anxiety is a state of restlessness and worry as a result of activation of the autonomic nervous system against a person's value system or an uncertain threat (Hüzmeli et al., 2023). Most patients with respiratory symptoms have anxiety and depression. This rate is reported to be 17-77% in patients with COPD and 4-80% in patients with lung cancer (Küçükakgün & Can, 2024). Most patients may experience anxiety due to fears such as uncertainty about their future and impending death. Disease-related symptoms such as pain and dyspnea may also increase anxiety. The patient's anxiety level should be evaluated with a distress thermometer (Kul, 2024). Although a number of pharmacologic agents are routinely used to manage anxiety, there is insufficient evidence that they are effective in patients in the last days and hours of life. Benzodiazepines are widely used at the end of life. However, they should be used with caution as they may cause memory impairment, dizziness, drowsiness and falls (Küçükakgün & Can, 2024).

Delirium

Delirium is a picture characterized by fluctuations in the state of consciousness, usually acute onset and reversible (Hüzmeli et al., 2023; Uysal & Durmuş, 2024). Delirium is also defined as impaired consciousness (Hüzmeli et al., 2023). However, delirium present in the 24-48 hours before death may not be reversible (Uysal & Durmuş, 2024). Hyperactive delirium is characterized by anxiety, agitation and attempts to remove external devices such as drain catheters. Less than one-third of delirium cases are diagnosed and therefore, current guidelines and recommendations recommend the use of validated scales for early diagnosis (Hüzmeli et al., 2023).

Roles of the Emergency Nurse in End-of-Life Symptom Management

Emergency nurses serve as the main component of the multidisciplinary team in the end-of-life care process and play critical roles in complex symptom management (Royani et al., 2025). In this context, the duties and responsibilities of the emergency nurse can be summarized as follows:

- Supporting patients' active participation in medical decision-making processes,

- To ensure a dignified, comfortable and symptomatically convenient dying process,

- Facilitate communication and care coordination between health professionals and relatives,

- To guide the transition from curative to palliative approach,

- To ensure that the patient spends their last days with their loved ones in a respectful way,

- To incorporate evidence-based assessment scales into clinical practice in symptom management,

- Effectively assess palliative symptoms and apply appropriate treatment algorithms,

- To adopt a holistic care approach that puts patients and their relatives at the center,

- Improving the quality of care by promoting standardized use of symptom assessment tools (Campbell et al., 2018; Düzgün et al., 2023; Swearinger, 2025a; Royani et al., 2025).

CONCLUSION

In the end-of-life care process, emergency nurses have a critical role in effectively managing patients' symptoms and ensuring their comfort. Emergency nurses should be actively involved in the management of the process to improve the quality of life of patients, support a dignified dying process and strengthen communication between the patient and his/her family. In addition, creating and implementing individualized care plans using evidence-based symptom assessment tools are among the main responsibilities of the nurse. Continuous improvement of emergency nurses' professional knowledge and skills in line with the principles of end-of-life care will increase the quality of health services provided during this period and patient satisfaction. In conclusion, emergency nurses, who are an indispensable part of the end-of-life care team, must try to address the needs of their patients and families from a comprehensive perspective with a comprehensive multidisciplinary approach.

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CHAPTER 3

NURSING CARE FOR POSTOPERATIVE COMPLICATIONS CAUSED BY FALLS IN AN ELDERLY PATIENT WITH HEARING IMPAIRMENT BASED ON WATSON'S HUMAN CARE MODEL: A CASE PRESENTATION

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Introduction

In nursing practice, accurately identifying an individual's physical, mental, and psychosocial needs forms the basis of effective and quality care. In this case, nurses should identify deviations in the individual's health status early on and plan and implement the care process in a way that responds to these needs (Jesse and Alligood, 2014). Theories and models not only provide a theoretical framework for nursing care, but also contribute to the systematisation of practices by supporting nurses' clinical decision-making

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skills and critical thinking processes. Thus, the quality of care improves, standardisation is achieved, and practices become evidence-based (Dağcı, 2019). Theoretical approaches enable the individualisation of nursing care while also facilitating the development of a common language among professionals (Zuhur and Özpancar, 2017). This is an important factor that strengthens the professional identity of nursing and reinforces its scientific aspect. One of the models within this theoretical framework, Jean Watson's Human Care Model (HCM), is a comprehensive and holistic approach that is frequently used in nursing practice. Watson defined the essence of nursing through the concept of 'care'; she emphasised that effective and healing care is based not only on technical knowledge but also on human values, love, compassion, and an understanding rooted in inner wisdom (Arslan, 2012; Caruso et al., 2008). The Human Care Model offers a holistic perspective within the nursing metaparadigm, which is based on the concepts of human, health, illness, and environment, by addressing nursing from both artistic and scientific perspectives (Watson, 2009). This model focuses not only on the individual's body but also on the integrity of the mind and spirit, viewing the nurse-patient interaction as a process that supports mutual development. According to Watson, humans are not objects but beings with a world of meaning, and therefore the care process should serve not only physical healing but also the support of spiritual integrity. This approach, which aims to achieve harmony between mind, spirit and body, adds depth to nursing practices and builds a meaningful relationship that enables nurses and patients to grow together (Caruso et al., 2008). Complications that may develop in the postoperative period, especially in elderly and disabled individuals, can affect the individual's well-being in a multidimensional way, physically, emotionally, and socially (Çankaya et al., 2014). Therefore, it is important that nursing care is structured to respond not only to physical needs but also to emotional and communicative needs. Jean Watson's Human Care Model aims to go beyond the technical aspects of nursing by introducing a holistic and humanistic approach to nursing care (Watson, 2010). The model is based on three main concepts: healing processes, interpersonal care relationships, and the moment of care (Keten and Kulakaç, 2023). Watson rejects the notion that nursing practices should be approached solely from a medical and mechanical perspective through healing processes. Instead, she aims to make the humanistic aspect of nursing visible by encouraging the strengthening of the connection between care and love (Watson, 2009). First introduced in 1979 and further developed between 1985 and 1988, these processes provide a framework consisting of 10 principles that guide nurses in their healing roles. Nurses who apply these principles do not merely focus on illness or

physical pathology; they also demonstrate sensitivity to the individual's quest for healing, wholeness, and meaning, thereby fulfilling their professional role with spiritual awareness (Jesse and Alligood, 2014). The second fundamental concept of the model, the interpersonal care relationship, refers to an ethical, artistic, scientific, and individualised interaction process established between the nurse and the individual. This relationship is shaped by the dimensions of self, existential space, and interpersonal communication (Erbay, 2018). According to Watson, this interaction is not merely a transfer of information; it is a unique process in which the nurse and the individual mutually connect with each other's inner worlds, establish a genuine bond by staying in the moment, and influence each other reciprocally. In this context, nursing becomes not merely the provision of a health service but also a spiritual experience encompassing a profound human sharing (Watson, 2007). The third and perhaps most meaningful component of the model, the moment of care, is an experience of human-to-human interaction that transcends time and space, where the life stories of the nurse and the individual intersect. These moments enrich human elements such as love, appreciation, respect, ethical sensitivity, and valuing, creating powerful bonds that provide healing and wholeness (Fawcett and Watson, 2013). The moment of care is a meaningful and transformative process in which the nurse touches not only the individual's body but also their soul. In this regard, Jean Watson's Human Care Model is an approach that enriches nursing practices with empathy, intuition, sensitivity, and the capacity to establish unique relationships, without limiting them to technical skills. This model defines the nurse-patient relationship not merely as the provision of services but also as a space for mutual growth between two individuals (Arslan, 2014; Caruso et al., 2018). The moment of care is a meaningful and transformative process in which the nurse touches not only the individual's body but also their soul. In this regard, Jean Watson's Human Care Model is an approach that enriches nursing practices with empathy, intuition, sensitivity, and the capacity to establish unique relationships, without limiting them to technical skills. This model defines the nurse-patient relationship not merely as the provision of services but also as a space for mutual growth between two individuals (Arslan, 2014; Caruso et al., 2018).

The aim of this study is to evaluate nursing care for an elderly and hearing-impaired individual who developed complications as a result of a fall during the postoperative period following orthopaedic surgery, in line with Jean Watson's Human Care Model. The case presentation emphasises the contribution of theory-based nursing care to the individual's well-being in terms of its physical, emotional and communicative dimensions.

Case Report

K.T. is a 76-year-old female patient with hearing impairment. She had been undergoing conservative treatment for persistent pain in her right knee for a long time; however, when the treatment failed to produce results, she was admitted to the hospital for orthopaedic surgery. The postoperative course was stable after the surgical procedure; however, on the second postoperative day, she fell while using the toilet, resulting in pain in front of the knee and loss of knee extension. The evaluation revealed a patellar tendon tear, and the patient underwent a second surgical intervention. The nursing care process was structured taking into account the patient's hearing impairment, individual needs, and communication barriers; special nursing approaches covering safety, communication, and psychosocial support dimensions were planned. In this process, Jean Watson's Human Care Model was used as a basis, and a comprehensive care process was carried out in line with the model's healing factors.

Healing Processes

Healing processes consist of ten fundamental processes that are interrelated and not clearly delineated. These processes are not based on rigid procedures; rather, they have a dynamic structure that requires flexible, individual-focused, and holistic care management (Watson, 2010).

1. **Humanity – Commitment:** The adoption of the values of humanity and commitment are among the fundamental principles that enable individuals to be provided with care based on love and compassion (Watson, 2007). These values contribute to the individual's sense of self-worth, allowing the care provided to gain meaning and depth (Watson, 2010). Humanity and dedication are not merely emotional approaches, but conscious and effective actions that form the basis of human-centred care (Erbay et al., 2018). Internalising these values supports the effective development and sustainability of professional care. Humanistic values encompass concepts such as humanity, self-sacrifice, and commitment, and involve approaching individuals with love and compassion. At the same time, this process is shaped through interpersonal interaction and communication, based on the individual's experiences and life events (Watson, 2012). In line with this process, K.T. was approached with love, compassion and interest; during communication, he was addressed by name, and individual respect was prioritised. During the data collection process, the principle of confidentiality was carefully observed, and

interviews were conducted alone whenever possible. This approach helped establish a relationship of trust with K.T., who expressed that this attitude made him feel valued.

2. **Hope-Faith:** This process involves instilling hope and faith in the individual. Its purpose is to understand the individual's spiritual needs and evaluate the concepts of faith and hope within the unity of mind, body, and spirit (Watson, 2007). In order to provide effective care, the individual's belief and value system must be taken into account and addressed in a manner consistent with the recovery process (Watson, 2010). Becoming aware of the emotions and beliefs experienced in the individual's inner world facilitates instilling hope in them (Erbay et al., 2018). In this context, eye contact was established in communication with K.T., and effective communication techniques were used to encourage the individual to express emotions such as anxiety, fear, and sadness. A safe environment was created for him to share his previous surgery experiences; he was motivated that the treatment and care process would yield positive results. K.T. was able to comfortably express the anxiety and sadness he experienced during this process. Despite the challenges he faced, he was informed about effective coping strategies (such as affirmation and meditation) to help him view life more positively and develop these techniques were applied together. Following all this support, K.T. stated that his confidence in overcoming the negative experiences he had faced had increased and that he had realised he could recover quickly and be discharged.

3. **Transpersonal Existence:** According to Jean Watson, transpersonal existence involves nurses approaching patients not only with their professional knowledge and skills, but also with the sensitivity that comes with being human. This process aims to develop individual beliefs and practices, as well as sensitivity towards oneself and others (Watson, 2012). Sensitivity in nursing is the ability to recognise another person's feelings and reflect this awareness in care practices (Watson, 2007; Watson, 2009). In this context, the care process for the patient named K.T. was planned taking into account his individual characteristics and communication barriers. K.T. is a 76-year-old patient with hearing impairment. He underwent conservative treatment for long-standing pain in his right knee; however, when the treatment failed to produce results, orthopaedic surgery was performed. Due to a fall on the second postoperative day, he developed a patellar tendon rupture and required another

surgical intervention. The patient's hearing impairment required special approaches in terms of both communication and psychosocial support. Therefore, a holistic approach based on sensitivity was adopted in the care process, using Jean Watson's Human Care Model as a basis. When communicating with K.T., written materials, facial expressions, eye contact and simple gestures were used; open-ended questions were asked to understand the patient's feelings and thoughts, and sufficient time was allowed for him to respond. With this approach, the patient's situation, level of perception and emotional needs were better understood. The patient's perceptions of their health, thoughts about their previous surgical experience and complications were listened to patiently, and any misconceptions or prejudices were addressed with explanations. The difficulties he may experience after the second surgery (limited mobility, fear of falling, social isolation, feeling of dependence) were discussed and he was given psychological support. In addition, care plans were made to meet both his physical and psychosocial needs, taking into account the difficulties he experiences in his daily life activities. Safety measures were increased, and non-slip mats, appropriate lighting, and easy access to call devices were provided in his room. The patient's active participation in the care process was encouraged, thereby ensuring that he felt valued as an individual.

4. **Authentic Caring Relationship:** In Jean Watson's theory, an authentic caring relationship is an interaction process that develops between individuals based on mutual trust, empathy, sincerity, and understanding. This relationship is based not only on the exchange of information but also on emotional sharing and the establishment of a genuine bond. An authentic relationship creates a supportive and reassuring environment between the nurse and the patient, enabling the individual to express themselves, share their feelings, and contribute to holistic healing (Watson, 2007; Watson, 2012). In line with this approach, care was taken to develop an authentic relationship with the patient named K.T. during the care process. K.T. is an elderly individual who has difficulty communicating due to a hearing impairment and has undergone a second surgical procedure following orthopaedic surgery. In this context, the care process was structured using communication techniques based on empathy and understanding, taking into account the patient's special circumstances. Firstly, non-verbal communication methods (eye contact, body language, written communication materials) were used

effectively to establish a trusting relationship with the patient; a calm, supportive and non-judgmental environment was created to make the individual feel safe and able to express their feelings freely. Patience and openness were fundamental to the communication process, and the patient was listened to and their feelings were taken seriously. Despite K.T.'s physical difficulties, a motivational and encouraging approach was adopted to support their self-care skills. Information was provided on the importance of mobilisation, and the early mobilisation process was safely supported with the nurse's physical assistance. Additionally, care was taken to provide psychosocial support, taking into account the patient's individual and cultural characteristics. The aim was to support the patient's well-being through methods such as affirmations (positive thinking statements) and simple breathing awareness exercises; the patient participated in these practices. These practices made it easier for the patient to cope with the uncertainty and anxiety caused by the second surgery and encouraged him to remain hopeful. As a result, the authentic care relationship established with K.T. demonstrated that nursing care is not limited to physical support but also involves an emotional bond based on trust, empathy, and sincerity.

5. **Listening and Expressing Emotions:** This process involves listening sincerely to the individual so that they can express their emotions confidently and creating space for emotional sharing (Watson, 2012). Active listening enables the nurse to understand the individual's fears, anxieties, and other emotions and guide the care process accordingly (Watson, 2007; Watson, 2009). In the care process conducted with K.T., a safe and sincere communication environment was provided with attention to privacy. He was encouraged to express his concerns related to two surgical experiences and ageing. He was supported in expressing his feelings comfortably through communication methods appropriate for his hearing impairment; the physical and emotional difficulties he experienced were met with understanding. During this process, concerns about body image, feelings of dependence, and the healing process were expressed, and the care plan was shaped accordingly.

6. **Problem Solving – Solution Search:** This process aims to develop creative and effective solutions to the problems experienced by individuals through scientific-based nursing practices (Watson, 2012). The nurse should combine aesthetics, art, and science in the care process to produce solutions tailored to the individual's needs

(Watson, 2007; Watson, 2010). K.T.'s pain, limited mobility, and anxiety related to falling after her second surgery were assessed; distraction techniques (breathing exercises, conversation accompanied by written communication) were used. Individualised education was provided on nutrition, wound care and safe mobilisation; simple visual materials were used to support learning. A participatory care process was carried out by consulting K.T.'s views, which made the patient feel more valued and empowered.

7. **Original Teaching – Learning:** This process aims to transfer information in accordance with the individual's learning style and needs, support self-care, and actively involve the patient in the decision-making process (Watson, 2010). An effective teaching-learning process facilitates the individual's assumption of responsibility for their health. K.T.'s learning process was specially planned based on their hearing impairment and age. Information on wound care, safe mobilisation, fall prevention, and exercises (e.g., strengthening the muscles around the knee) was provided using written and visual materials. The explanations were simplified, supported with drawings when necessary, and sufficient time was allowed for understanding. As a result, K.T. actively participated in his own care and acquired skills that he could apply in daily life.

8. **Therapeutic Care Environment:** The therapeutic care environment aims to provide a peaceful and safe environment where individuals can feel comfortable physically, emotionally, and spiritually. This environment plays a critical role in both maintaining health and supporting recovery (Watson, 2007; Watson, 2009). During K.T.'s care process, environmental adjustments were made to accommodate his hearing impairment and age. Privacy was maintained, the lighting and temperature in the room were adjusted to the patient's comfort level, and unnecessary visitors and sources of noise were removed from the environment. This created a physically and emotionally supportive, safe, and calm healing space.

9. **Assistance with Basic Needs:** This process forms one of the cornerstones of nursing care by addressing the individual's physical, emotional, and mental needs with a holistic approach (Watson, 2007; 2009; 2010; 2012). Meeting these needs supports the healing process by increasing the individual's participation in self-care. K.T.'s basic needs were identified during the care process, and support was provided in these areas. In particular, it was observed that he needed

assistance with mobilisation, nutrition, hygiene, and toileting. Considering the mobility restrictions following knee surgery, support was provided for safe mobilisation, and information was provided on personal hygiene and perineal care. Communication appropriate for hearing impairment was provided, emotional needs were taken into account, and a supportive care environment was created with respect for privacy.

10. **Allowing for Existential-Phenomenological Spiritual Dimensions:** This process aims to help the individual make sense of their experiences of life, illness, death, and existence. The nurse respects the individual's inner world and supports their intuitive and spiritual side (Watson, 2012). The factors of K.T.'s repeated surgical processes, old age, and disability have increased the need for spiritual support. In this context, effective and trust-based communication was established with K.T., and he was encouraged to express his anxieties, fears about the future, and internal conflicts. In line with his spiritual needs, a supportive attitude was adopted while respecting his values. The importance of family support was emphasised, and the importance of his relatives sharing responsibility in the home care process after discharge was discussed with the patient and his family. With this holistic approach, the aim was to increase K.T.'s self-confidence and develop his ability to cope with stress.

Conclusions and Recommendations

This case highlights the need to evaluate postoperative care for elderly individuals with hearing impairments not only in terms of physical aspects, but also in terms of emotional, social, and communicative dimensions. The risk of complications that may arise, particularly in elderly individuals, necessitates a more careful and comprehensive approach to the care process. At this point, Jean Watson's Human Care Model adds not only a technical but also a human dimension to nursing practices, supporting the individual's holistic well-being. The compassion-based approach offered by the model enhances the quality of nursing practices by focusing not only on the patient's clinical needs but also on their emotional security, right to communication, and individual autonomy. In this particular case, the use of Watson's care factors enabled the personalisation of nursing interventions; the transpersonal relationship established with the patient played a role in increasing trust, cooperation and satisfaction levels.

In this regard, the following recommendations can be made:

• Teaching theoretical models in nursing education with application-based examples will strengthen the holistic nature of care.

• When preparing care plans, especially for disabled and elderly individuals, it is recommended to work with models that take into account both physical and psychosocial needs.

• Nurses should be encouraged to adopt individualised care approaches in clinical practice; empathy, communication and ethical sensitivity should be strengthened in care processes.

• In order to improve the quality of care, theoretical models should be encouraged to be used not only as theory but also as clinical guidance.

In conclusion, the use of human-centred nursing theories such as Watson's Human Care Model in patient groups with complex and multidimensional care needs advances both the patient experience and the scientific foundations of the nursing profession.

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CHAPTER 4

FORGETTING A FOREIGN BODY DURING SURGERY, A COMMON MEDICAL ERRORS AND ITS PHYSIOPATHOLOGY

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Dilek AYGİN[2]

Abstract

In parallel with the increase in the aging population, the rate of surgical intervention for geriatric individuals is also increasing. Elderly individuals need surgical interventions due to chronic diseases such as hypertension, heart disease, diabetes, osteoporosis, osteoarthritis, and fractures due to falls and traffic accidents. Medical errors are also encountered during these surgical procedures. Medical errors cause financial, spiritual and psychosocial problems for patients. In general, it is reported that one in 10 patients is harmed while providing health care services and more than three million deaths occur each year due to unsafe treatment. Research shows that surgical errors are the most frequently reported preventable medical errors in the healthcare system. It is stated that despite measures taken to ensure patient safety during healthcare and treatment, medical errors still occur and that these medical errors can result in death, injury, disability, or treatment interruption or failure. Surgical errors mostly occur in operating room

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environments. Pressure injuries related to surgical position, hypothermia, medication errors, fire, wrong patient, wrong site surgery, improper surgical pathology material management technique, problems developing in blood and blood product transfusion and forgetting a foreign body are the most common surgical errors. Foreign bodies are surgical materials that are unintentionally forgotten in the patient's body. Abdominal compresses, sponges, surgical instruments and parts, scalpels, drain parts and surgical sutures are forgotten surgical materials. Abdominal, urology, gynecology, cardiovascular surgery and orthopedic surgeries are the areas where foreign bodies are most frequently forgotten. Foreign bodies forgotten in the patient's body may remain unnoticed for years without any symptoms or may appear with symptoms such as pain, fever, and infection. The patient's response to a foreign body forgotten in the body develops in the form of fibrotic reactions caused by calcification and granuloma formed by macrophage cells of the immune system. It is stated that fibrotic response can cause masses, tissue growth, intestinal obstruction, perforation, and fistula formation on internal organs. Another response to foreign bodies is the exudative response, which is the formation of inflammation and purulence. In this case, patients face negative situations such as having to undergo surgery again due to forgetting the foreign body.

One study reported that the mortality rate due to complications in 1,100 foreign body removal surgeries was 4.5%. Forgetting a foreign body negatively affects the patient's life and also exposes countries and healthcare institutions to malpractice lawsuits. Countries, healthcare institutions and healthcare professionals should recognize the risk factors for preventing foreign body retention, review the guidelines of the American Perioperative Nurses Association, implement them and train healthcare professionals, and establish standard procedures. Therefore, the purpose of this review article is to examine the importance and pathophysiological process of forgetting a foreign body during surgery, which threatens patient safety.

Keywords: Foreign Body Forgotten, Patient Safety, Medical Error, Pathophysiology

1. Introduction

1.1. Importance of Forgetting Foreign Body

The number of elderly individuals continues to increase in Turkey, Europe and the world. According to the 2022 data of the Organisation for Economic Co-Operation and Development (OECD), Japan ranks first with

55.4% and Italy ranks second with 41.50% as the country with the largest elderly population. According to the 2024 data of the Turkish Statistical Institute (TUIK), the population aged 65 and over increased by 9 million 112 thousand 298 in the last five years (TUIK, 2024). It is stated that with advancing age, individuals experience deterioration in their body functions and accompanying chronic diseases and diseases such as falls, urinary incontinence, cataracts and femur fractures brought on by old age (Arslan et al., 2020). With aging, obesity, chronic diseases and traffic accidents increase the need for surgical treatment (Özşaker, 2023). According to the Health Statistics Yearbook (SİY) (2023), the number of surgeries, which was 5.773.049 in 2022, increased by approximately 4% and reached 5.992.338 (SİY, 2023). The most important goal of health services is to provide and maintain a useful health care service that meets the basic needs of individuals (Korkmaz, 2018). Medical errors occur in the stages of ensuring patient safety (Özkan and Aslan, 2020). Medical errors have important human, moral, ethical and financial consequences (Keleş and Aloğlu, 2019). According to the World Health Organization (WHO), patient harm due to safety errors in healthcare services is increasing and these errors can occur at all stages of healthcare provided to the patient (WHO, 2023). According to the Safe Reporting System (GRS), it is stated that 6.527 surgical error reports were made in 2017 in our country (GRS, 2017). Surgical error reports by the Safe Reporting System by month are given in Figure 1.

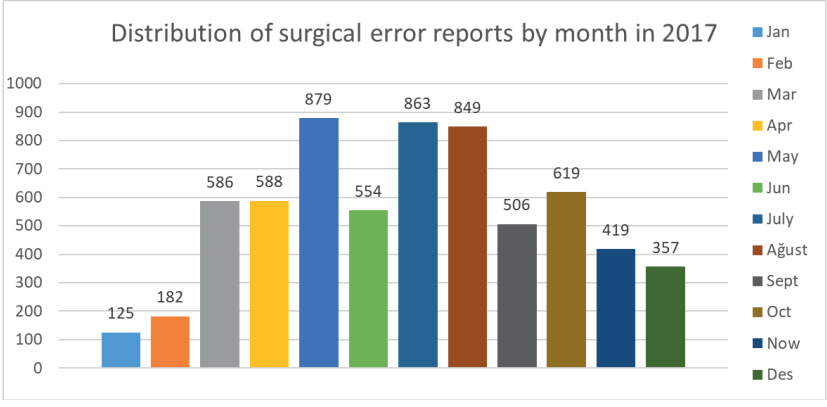

Figure 1. Surgical error reports reported to GRS by month (GRS, 2017)

Slawomirski and Klazinga (2020) report that approximately one in 10 patients experience problems while providing health care, and more than three million deaths occur each year due to unsafe care (Slawomirski and

Klazinga, 2020). They state that in poor to middle-income countries, four out of 100 people die due to unsafe care, and patient harm slows global economic growth by 0.7% per year (Slawomirski and Klazinga, 2020). It is known that in the United States (USA), medical errors are the third leading cause of death and approximately half a million people die each year due to medical errors. On a global scale, the estimated cost of damage is estimated to reach trillions of US dollars each year (Makary and Daniel, 2016). Medical errors also occur as a result of carelessness, ignorance, inadequate patient care, and lack of skill (Güven et al., 2019). In the study by Manav and Karademirler (2018), it is stated that surgical procedure errors are the most common and most reported preventable medical errors in the health care system, and that these medical errors can lead to death, injury, disability, or treatment interruption or failure.

It is stated that medical errors occur most in the operating room environment and 14.6% of these patients are exposed to medical errors (Henry et al., 2012). Medical errors and adverse events that prevent patient safety in the operating room and are likely to occur are pressure injuries due to surgical position, hypothermia, medication errors, fire, wrong patient, wrong side, wrong site surgery, improper surgical pathology material management technique, problems developing in blood and blood product transfusion, and forgotten foreign objects (Uğur et al., 2016; Othman et al., 2020; Kim and Jeong, 2021). Surgical materials/instruments that are unintentionally retained by patients after surgical interventions in the operating room and these forgotten foreign objects are defined as "retained surgical artifacts" (RSI) (Wallace, 2017). In the study conducted by Szymocha et al. (2019), a forgotten foreign object is defined as "an object left in the patient" and is explained as "a situation that should not occur and a preventable error" (Szymocha et al., 2019). Forgetting a foreign object causes serious health problems for patients and legal problems for healthcare institutions and employees (Al Qurayshi et al., 2015).

The most frequently forgotten materials in the operating room are sponges and abdominal compresses (Cima et al., 2022). The Joint Commission International (JCI) reported that 1,411 adverse event reports were received in 2023, and foreign body forgetting (n=110, 8%) ranked third among these reports (JCI, 2023). Although the exact incidence of foreign body forgetting is not known, studies estimate that it is seen in every 1,000-1,500 abdominal surgeries (Gawande et al., 2003). In the study conducted by Gunnar et al. (2020), it was stated that the incidence of foreign body forgetting was 1 in 23,000 cases (Gunnar et al., 2020). In the study by Takahashi et al., it was reported that complications developed in 2.13 patients out of 1000 cases and

foreign body was forgotten in 0.48 patients out of 1000 patients in 49,831 operations performed (Takahashi et al., 2023). It is stated that foreign body was forgotten in many cases during the operation, during the counting of materials and intra operative X-rays, and before the operation was completed (Takahashi et al., 2023). Zarenezhad et al. (2017) reported that 18% of the surgeries in which foreign bodies were forgotten were general surgery, 13% were gynecology and urology, 5% were orthopedics, and 2% were cardiac surgeries, respectively (Zarenezhad et al., 2017). In the study conducted by Rupp et al. (2012), the reason for the low incidence of forgotten foreign bodies was that this condition was noticed years after the surgery, did not cause symptoms, and required long-term follow-up (Rupp et al., 2012).

1.2. Pathopathology of Forgotten Foreign Body in the Operating Room

Every foreign body creates a defense situation in the body by our immune system. Foreign bodies left in surgery show different symptoms depending on the type of material, the region and the patient's body defenses (Sharma and Bigelow. 2014). Studies have shown that foreign bodies forgotten in the bodies of patients who have had abdominal surgery can sometimes cause acute or chronic inflammation, and sometimes show no symptoms for years (Sharma and Bigelow, 2014; Szymocha et al., 2019; Noskovicova et al., 2021). The first reaction to a foreign body forgotten in the body comes from the neutrophil, and they are white blood cells that defend against infection. Neutrophils come to the area and try to phagocytose the foreign body, if the foreign body cannot be destroyed, macrophages formed by monocytes take over the task. If macrophages cannot digest the particles they phagocytose, they form clusters. These clusters are called granulomas. Granuloma consists of cells called foreign body giant cells. The granuloma, which consists of macrophages, is surrounded by lymphocytes and fibrosis caused by collagen fibers develops in the later process. The body has three reactions to objects that cannot be phagocytosed (Geraint, 2000; Rose et al, 2014; Mariani et al. 2019; Noskovicova et al, 2021).

- Inflammatory pus forms around the foreign body, creating a fistula and removing the foreign body from the body.
- The foreign body is completely surrounded and scar tissue is formed.
- The foreign body is trapped in the granuloma tissue (Geraint, 2000).

In the study by Styskel et al. (2016), it was stated that the mortality rate due to complications in 1,100 cases of forgotten foreign bodies was 4.5%.

The reaction given to a foreign body forgotten in the patient's body manifests itself in the form of an acute or chronic inflammatory response (Styskel et al, 2016). The reactions given to the foreign body forgotten in the patient's body are calcification and fibrotic reactions caused by granuloma formed by macrophage cells of the immune system. Fibrotic reactions can occur coincidentally without showing any symptoms (Sharma and Bigelow, 2014). It is stated that fibrotic response can cause mass, tissue increase, intestinal obstruction, perforation and fistula formation on internal organs (Ranjan et al., 2023). Another reaction of the body to foreign bodies is infection (Sharma and Bigelow, 2014). It is stated that infection occurs early or late after the operation and manifests itself with complaints such as a certain symptom and pain (Ranjan et al., 2023). The steps of our body's reactions to foreign bodies are shown in Figure 2 (Kumar et al., 2017).

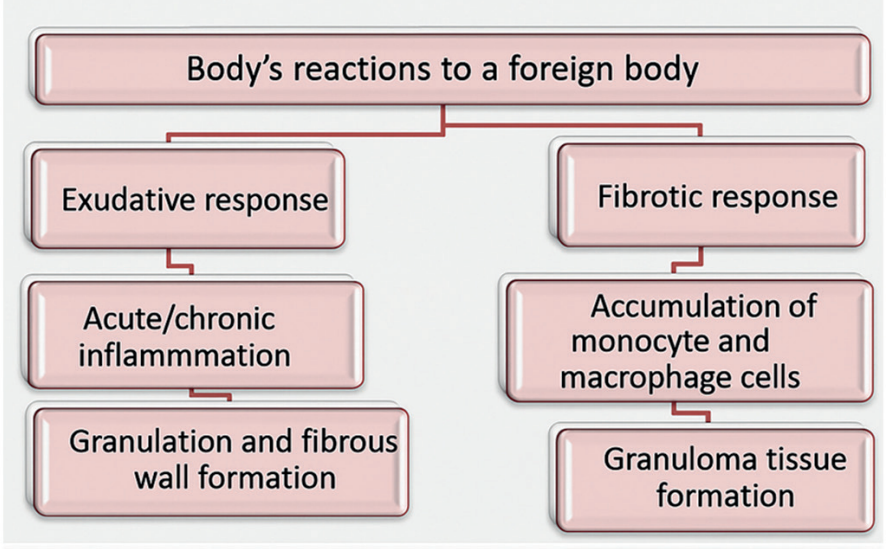

Figure 2. Our body's reactions to foreign bodies (Kumar et al., 2017)

Foreign bodies forgotten in our bodies may show signs of infection such as fever, rash and abdominal pain in the early postoperative period or may cause fibrous reactions that do not show symptoms for years (Hariharan and Lobo, 2013). Studies have shown that forgotten foreign bodies cause metal erosion, fibrous tissue formation and tumor formation in the following years (Wu et al., 2018). It is reported that foreign bodies are more common in emergency surgeries, complex major surgeries and in overweight patients (Gavric Lovrecetal., 2018). Kumar et al. (2017) reported in their study that

patients experienced complications such as ileus, intestinal perforation, stomach and intestinal bleeding, inflammation of the peritoneum and septic shock due to forgotten foreign bodies (Kumar et al., 2017). In the study conducted by Zarenezhad et al. (2017), it was revealed that in patients who had a foreign body forgotten during surgery, 84.32% had pain, 51.32% had fever, 44.73% had septic shock, 23.68% had abdominal pus accumulation, and 2.63% had complications such as ileus and intestinal rupture, and were reoperated (Zarenezhad et al., 2017).

As a result, forgetting a foreign object in the surgical field is the first medical error that increases the risk of patient safety. It has remained a significant problem from the past to the present (Güven et al., 2019). For this reason, numerous studies are being conducted to develop strategies to prevent this problem. Soft products such as sponges and gas compresses, needles and surgical instruments are the most forgotten objects, and the abdomen/pelvis, vagina and joints are the surgical areas where foreign objects are most often forgotten (Taşdemir, 2015). Among the preventable medical errors, forgetting a foreign body threatens patient safety due to human, environmental and surgical factors; it negatively affects the patient, healthcare professionals and the institution. For the patient, re-operation, life endangerment due to infection and patient mortality are observed (Zarenezhad et al., 2017). Foreign body forgetting cases also leave institutions face to face with legal lawsuits in terms of malpractice. To prevent these medical errors, the guide published by AORN (2022) is used, which includes factors such as the use of an evidence-based communication model among the surgical team, the use of consistent counting methods, record keeping and the use of technology (Cochran, 2022). Foreign body forgetfulness is the responsibility of the entire surgical team. However, operating room nurses play a key role in preventing foreign body forgetfulness as team members who manage the operating room and perform the count.

Resource

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CHAPTER 5

RETROSPECTIVE EVALUATION OF POISONING CASES APPLIED TO THE EMERGENCY SERVICE: A STATE HOSPITAL EXAMPLE

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ABSTRACT

OBJECTİVE: This study was conducted to retrospectively examine acute poisoning cases admitted to a state hospital emergency unit.

MATERIAL AND METHODS: This descriptive-retrospective study included 125 patients who applied to the Emergency Department of M. Kazım Dinç Kandıra State Hospital due to poisoning between 01.01.2023 and 31.12.2023. Before starting the study, ethics committee approval was obtained and the patients' records were retrospectively reviewed. Descriptive and parametric tests were used to evaluate the collected data.

RESULTS: The mean age of the cases was 34.44±24.85 (1-82 years), 27.2% were in the 15-30 age group, and 50.4% were male. It was determined that poisoning cases were mostly applied to the emergency department in

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the autumn season (30.4%) and between 16.00-23.59 (45.6%). Of the 125 poisoning cases, 31.2% (n=39) were drug poisonings, and 56.42% (22/39) of these were women. When evaluated in terms of poisoning route, it was determined that 72% was through the GIS, 17.6% through the respiratory tract and 10.4% through the skin. Reasons for exposure to the agent were determined as 73.6% accidental, 16% suicidal and 10.4% exposure to toxic substances. 84% of the cases were discharged after treatment in the emergency room, 16% were transferred to the intensive care unit of other hospitals.

CONCLUSION: As a result, in our study, similar to the studies in the literature, it was determined that poisoning cases were more common in the young age group; it was seen that the majority of these cases were drug poisoning. It may be recommended that the awareness of healthcare professionals working in emergency services be increased and that people applying to emergency services be given counseling on precautions against poisoning. We believe that comprehensive research should be conducted and public attention should be drawn to prevent poisoning and to reduce mortality and morbidity.

KEYWORDS: acute poisoning, drug poisoning, emergency care and treatment

INTRODUCTION

Poisoning has been a significant health problem affecting societies since ancient times (Yeşil et al. 2008). Although preventable, poisoning is a significant public health problem with high morbidity and mortality rates both globally and in our country (Senarathna et al. 2012, Mazer-Amirshahi et al. 2016). Poisoning also accounts for a large portion of emergency room visits (Frithsen and The clinical condition resulting from exposure to a potentially toxic dose of an agent is called “poisoning”. Poisoning can occur due to reasons such as intentional suicide, accidental (often in children), environmental or occupational exposure, drug side effects, therapeutic errors (wrong drug, dose, and patient, drug-drug/drug-food interactions), drug abuse, food poisoning, corrosive substances, drugs, animal bites, and chemical and biological warfare (İzdeş 2011).

According to the 2023 National Poison Data System (NPDS) report from the United States (US) Poison Centers, approximately 2.1 million human exposures are reported to US poison control centers each year. Children under the age of six account for almost half (45%) of reported exposures. In Turkey, the 2021 report of the National Poison Information Center (UZEM) indicates

that 217,323 adult poisoning cases are presented to emergency departments annually. The most common acute poisoning agents in Turkey are drugs, pesticides, household chemicals, toxic gases and other chemicals, plants and foods, and poisonous animal bites and stings (Koç 2021). Studies indicate that the cause and agent of poisoning vary by age, gender, and season, with poisonings caused by oral medications being more common and occurring more frequently in adult women (Kucukal and Erkan 2017, Aydın 2019).

Early and appropriate intervention is crucial for all poisonings (Sönmez et al. 2012). When a potential acute poisoning is suspected, rapid diagnosis and treatment are crucial due to the high morbidity and mortality rates (Demirel et al. 2020). The type and causes of poisoning vary depending on numerous factors, including society's customs and traditions, season, education level, traditions, socioeconomic status, age, and gender (Sönmez et al. 2012). Therefore, every country, and even every region, needs to investigate the etiological and demographic characteristics of poisonings and take the necessary precautions (Vural and Avşaroğulları 2023).

While there are sufficient studies in our country on patients presenting to emergency departments with a preliminary diagnosis of poisoning, there is a need to update poisoning statistics and publish new publications on this topic on a regular basis (Dal et al. 2013). This study aimed to examine acute poisoning cases presenting to a state hospital emergency unit.

MATERIALS AND METHODS

This descriptive-retrospective study comprised 125 patients who presented to the Emergency Department of M. Kazım Dinç Kandıra State Hospital due to poisoning between January 1, 2023, and December 31, 2023. All poisoning cases presenting to the emergency department within a year were included in the sample selection, without applying any exclusion criteria. The study was initiated after obtaining approval from the Kocaeli City Hospital Scientific Ethics Committee (Ethics Committee No. E-65530689-799-236963544). Patient records were reviewed retrospectively. These cases were evaluated for descriptive characteristics such as age, gender, case type, means of admission to the hospital , season of admission, admission time, substances causing poisoning, route of poisoning, purpose of ingestion, complaint for presentation to the emergency department, mortality, and discharge status.

STATISTICAL ANALYSIS

Statistical analysis of the data was performed in a computer environment using descriptive and parametric tests such as mean ± standard deviation, median, and percentage. A p value of <0.05 was considered significant.

FINDINGS

The mean age of the cases included in the study was 34.44±24.85. When all poisoning cases were evaluated in all age groups, it was found that the majority (27.2%) were between the ages of 15-30. While 63 (50.4%) of the cases were male and the mean age was 35.39, 62 (49.6 %) were female and the mean age was 33.46 (Table 1). No significant difference was found between them in terms of gender (p>0.05; *not shown in the table*). When the poisoning cases were examined in terms of case type, the majority were emergency cases (95.2%). Considering the application hours to the emergency department, the busiest time period for applications was determined to be 16:00-23:59 (45.6%) (Table 1).

When the seasonal distribution of poisoning cases is evaluated, it is seen that the highest number of admissions occurred in the autumn months (30.4%). The admission rates in summer (27.2%) and winter (25.6%) were similar, with 16.8% of admissions recorded in the spring months (Table 1).

Drug poisonings were the most common cause of all poisonings, accounting for 31.2% (39/125), with more females (17.6%; 22/125) than males (13.6%; 17/125). This was followed by mushroom (28.8%), food (7.2%), scorpion contact (7.2%), carbon monoxide (6.4%), and drug (6.4%) poisonings (Table 1).

It was found that the substance causing poisoning was most commonly ingested (72%) and that the rate was significantly higher in the under 15 age group (20.8%; 26/125). Inhalation poisoning was higher in the 15-30 age group (7.2%; 9/125) and dermal poisoning was higher in the 46-60 age group (5.6%; 7/125) (Table 1). The main cause of poisoning in those aged 15 and under was accidental drug ingestion (20.8%) (p<0.05; *not shown in the table*).

The vast majority of poisoning cases (92.8%) were found to have arrived at the emergency department by their own means. When discharge status was evaluated, it was determined that 84% of those presenting were treated in the emergency department as day patients and then discharged, 16% were

transferred to intensive care units at other hospitals, and no cases resulted in death while in the emergency department (Table 1).

Table 1. Descriptive Characteristics of Poisoning Cases Presenting to the Emergency Department

Introductory Features		**n**	**%** *
Age MEAN±SD= 34.44±24.85 Median (min / max); 29 (1/82)			
Grouped Age	Ages 15 and under	31	24.8
	15-30 years old	34	27.2
	31-45 years old	16	12.8
	46-60 years old	17	13.6
	61 years and older	27	21.6
Gender	Woman	62	49.6
	Male	63	50.4
Case Type	Urgent	119	95.2
	Judicial case	6	4.8
Emergency Department Application Hours	08.00-15.59	52	41.6
	16.00-23.59	57	45.6
	00.00-07.59	16	12.8
Season of Emergency Visit	Spring	21	16.8
	Summer	34	27.2
	Autumn	38	30.4
	Winter	32	25.6
Main Diagnosis	Exposure to and Accidental Poisoning by Drugs, Pills, and Biological Agents	39	31.2
	The Toxic Effect of Eating Mushrooms	36	28.8
	Food Poisoning	9	7.2
	Contact with Scorpions	9	7.2
	Toxic Effects of Carbon Monoxide	8	6.4
	Exposure to and Poisoning by Drugs, Medications and Other Biological Substances	8	6.4
	Toxic Effects of Gases, Fumes and Vapors	5	4.0
	Exposure to and Poisoning by Chemicals and Harmful Substances	5	4.0
	Contact with Stinging Fish	3	2.4
	Toxic Effects of Corrosive Substances	2	1.6
	Contact with Poisonous Snakes and Lizards	1	0.8

Causative Agent	Medicines	39	31.2
	Mushroom	36	28.8
	Foods	9	7.2
	Scorpion	9	7.2
	Carbon monoxide	8	6.4
	Drugs	8	6.4
	Gases, smoke	5	4.0
	Chemicals	5	4.0
	Corrosives	2	1.6
	Stinging fish	3	2.4
	Snake	1	0.8
Poisoning Path	GIS	90	72.0
	Respiratory	22	17.6
	Skin	13	10.4
Reason for Taking the Agent	Accident	92	73.6
	Suicide	20	16.0
	Exposure to toxic substances	13	10.4
How He Came to the Emergency Room	Own resources	116	92.8
	Emergency 112	9	7.2
Discharge Status	Daily emergency	105	84.0
	Transfer to intensive care	20	16.0

*Percentage given among 125 people.

Note: *GIS:Gastrointestinal system*

Table 2. Complaints of Poisoning Cases Presenting to the Emergency Department

Complaints Regarding Emergency Department Admission	n	% *
Nausea	100	80
Vomiting	88	70.4
Stomach ache	78	62.4
Diarrhea	52	41.6
Tendency to sleep	46	36.8
Confusion	19	15.2
Respiratory distress	17	13.6
Skin redness	13	10.4
Palpitation	13	10.4
Difficulty swallowing	1	0.8

*Percentage taken from 125 people. More than one complaint was marked. Only the "existence" of the complaint is given as a number and percentage.

Symptom in patients presenting to the emergency department due to poisoning was nausea (80%), followed by vomiting (70.4%) and abdominal pain (62.4%) (Table 2). No significant difference was found between the symptom finding rates, which varied depending on the poisoning agent, and gender (p>0.05; *not shown in the table*).

Table 3. Distribution of the reason for taking the agent and average age

Reason for Taking the Agent	n	%	Average age	K		TO	
				n	%	n	%
Accident	92	73.6%	36.44	44	35.2%	48	38.4%
Suicide	20	16%	30	11	8.8%	9	7.2%
Exposure	13	10.4%	27.07	7	5.6%	6	4.8%
Total	***125***	***100%***		**62**	**49.6%**	**63**	**50.4%**

*Percentage out of 125 people.

When poisoning cases were evaluated in terms of the cause of ingestion, the most common cause was accidental poisoning at 73.6%. This was followed by suicide attempts at 16% and exposure-related poisoning at 10.4%. The age range of those accidentally poisoned was 1-82, with an average age of 36.44. The age range of those who committed suicide was 15-62, with an average age of 30. The age range of those exposed was 1-74, with an average age of 27.07 years (Table 3).

Of those accidentally poisoned, 38.4% (48/125) were male, 8.8% (11/125) of those who committed suicide were female, and 5.6% (7/125) of those exposed were female (Table 3). There was no significant difference in terms of causes of poisoning and gender ($p>0.05$; *not shown in the table*).

When the seasonal distribution of cases was examined, the most frequent presentation was in autumn with 38 (30.4%) cases (Figure 1). When the seasonal distribution of poisonings was compared according to the reason for ingestion, accidental poisonings were most common in autumn (28.8%), exposures were most common in winter (9.6%), and suicide attempts were most common in summer (8.8%). When the seasonal distribution and the reason for ingestion were examined, a significant difference was found between the season and the reason for ingestion in poisonings resulting from suicide, accidents, and exposure ($p<0.05$; *not shown in the table*).

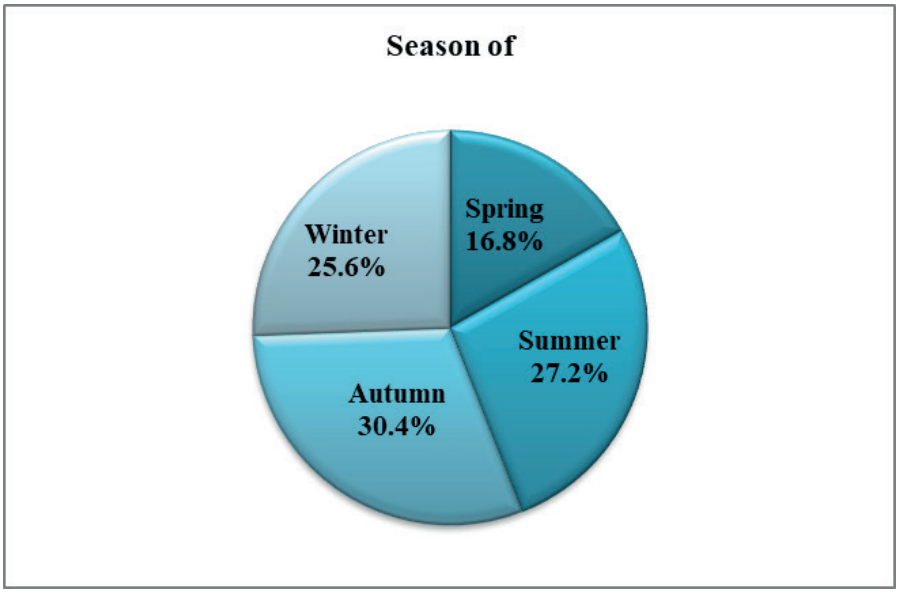

Figure 1. Distribution of patients by season

*Percentage out of 125 people.

Drug poisonings (12.8%; 16/125) were most common in summer, mushroom poisonings were most common in autumn (18.4%; 23/125), and carbon monoxide poisonings were most common in winter (6.4%; 8/125). Animal bites accounted for 10.4% (13/125). Nine of these were scorpion bites, three were fish bites, and one was snake bite (Table 4). A significant difference was found between the substances causing the poisoning and the season of admission ($p<0.05$; *not shown in the table*). Accordingly, it was determined that the highest incidence was in autumn (30.4%).

Table 4. Season of Application and Distribution of Substances Causing Poisoning

	Spring		**Summer**		**Autumn**		**Winter**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	***%**
Medicines	11	8.8%	16	12.8%	7	5.6%	5	4.0%	**39**	**31.2%**
Mushroom	1	0.8%	4	3.2%	23	18.4%	8	6.4%	**36**	**28.8%**
Foods	2	1.6%	2	1.6%	3	2.4%	2	1.6%	**9**	**7.2%**
Scorpion	1	0.8%	5	4.0%	1	0.8%	2	1.6%	**9**	**7.2%**
Carbon monoxide	0	0.0%	0	0.0%	0	0.0%	8	6.4%	**8**	**6.4%**
Drugs	3	2.4%	2	1.6%	2	1.6%	1	0.8%	**8**	**6.4%**
Gases, fumes	1	0.8%	0	0.0%	0	0.0%	4	3.2%	**5**	**4.0%**
Chemicals	1	0.8%	1	0.8%	1	0.8%	2	6.3%	**5**	**4.0%**
Stinging fish	1	0.8%	2	1.6%	0	0.0%	0	0.0%	**3**	**2.4%**
Corrosives	0	0.0%	1	0.8%	1	0.8%	0	0.0%	**2**	**1.6%**
Snake	0	0.0%	1	0.8%	0	0.0%	0	0.0%	**1**	**0.8%**
Total	**21**	**16.8%**	**34**	**27.2%**	**38**	**30.4%**	**32**	**25.6%**		**100%**

Percentage out of 125 people.

DISCUSSION

This study retrospectively evaluated and presented data from patients presenting to the emergency department of a district state hospital with acute poisoning. Poisoning, which constitutes a significant portion of emergency department visits, continues to be a common cause of morbidity and mortality worldwide (Frithsen and Simpson 2010). While data vary from country to country, poisoning accounts for a significant portion of hospital emergency department visits.

In Australia, the rate of intoxications is 5% of all admissions, while in China it is 3% and in the UK it is 1% (McGrath 1989, Thomas et al 1996, Liu , Wolf and According to the 2023 report of the National Poison Data System (NPDS) from the United States Poison Centers, the top four substance classes most frequently present in all human exposures were analgesics (11%), household cleaners (7.12%), antidepressants (5.58%), and cosmetics/ personal care products (5.01%) (Gummin et al 2023).

Studies conducted in Turkey have shown that poisoning cases account for 0.7-5.0% of all emergency room visits (Deniz et al. 2009). It is estimated that 150,000 poisoning cases occur annually in Turkey (Erdoğan et al. 2013). Approximately 5% to 22% of patients presenting to the emergency room due to intoxication require intensive care (Nogue et al. 1992, Henderson et al. 1993).

In the publications, 6.2% of the poisoning cases in Bursa Uludağ Faculty of Medicine (Demircan et al. 2005), 1.78% in Kırıkkale University Faculty of Medicine (Deniz et al. 2009), 0.76% of the emergency admissions in Istanbul Vakıf Gureba Hospital (Uyanıkoğlu et al. 2007), 0.38% in Tokat Gaziosmanpaşa University Faculty of Medicine (Ayan et al. 2012), and 0.26% in Sivas Numune Hospital (Yılmaz et al. 2013) were reported as acute poisonings.

In the study conducted by Günay et al. (2022), 63.9% of the patients were reported to be female, and the mean age was 38.89±16.16. Similarly, in the study conducted by Kızılkaya et al. (2023), 62.6% of the patients presented due to poisoning were female, and the mean age was 34.08±13.51. In the study conducted by Demirel et al. (2020), more than half of the patients (51.5%) presented to the emergency room due to poisoning were female, and the mean age was 36.1. Similarly, in a retrospective study conducted by Yeşil et al. (2008), it was found that 56.5% of the patients presented to the emergency room due to poisoning were female, and the mean age was 34.91±14.64. In the study conducted by Kavalcı et al. (2006), it was reported that poisoning cases were most common in the 16-25 age group. Similarly, a retrospective study by Akköse et al. (2006) reported that poisoning was most common in the 14-25 age group. A study by Keleş et al. (2003) also reported that poisoning was most common in the 15-29 age group. Unlike some literature, half of the patients in our study were male, but the mean age in our study (34.44±24.85) is similar to the literature. Consistent with the literature, poisoning cases in our study were most common in the 15-30 age group. Based on these findings, it can be said that poisonings particularly affect younger populations.

A study by Keskin and colleagues (2018) reported that the number of patients admitted due to poisoning increases in the spring, especially in May and June. A study by Kızılkaya et al. (2023) reported that the time of admission to the hospital due to poisoning was between 4:00 PM and 11:59 PM in 56.1% of cases. Similarly, a study by Deniz et al. (2009) reported this rate to be between 4:00 PM and midnight in 55.6%, and a study by Dal et al. (2013) reported it to be between 4:00 PM and 11:59 PM in 49.6%. Our study findings show that while admission rates are similar across all seasons, the highest number of admissions (30.4%) occur in the autumn months, and the majority (45.6%) occur between 4:00 PM and 11:59 PM. When compared with studies in the literature, our study reveals similar results in terms of admission times. The higher incidence of carbon monoxide poisoning during the winter months may be linked to increased stove use. Similarly, the higher incidence of poisonous animal bites and stings during spring and summer may be explained by increased outdoor activity and increased activity in field work during these seasons.

It is seen in the literature that drugs are reported as the most common poisoning agent, and the results of our study were found to be consistent with these data. While the drug poisoning rate was reported as 80.2% in the study by Yılmaz et al. (2013), this rate was determined as 72.7% in the study by Sönmez et al. (2012). Similarly, drugs ranked first with a drug poisoning rate of 72.3% in the study by Aydın et al. (2020), 63.2% in the study by Vural et al. (2023), 61.3% in the study by Erdoğan et al. (2013), 49% in the study by Yeşil et al. (2008), 47.2% in the study by Ayan et al. (2012), and 37% in the study by Deniz et al. (2009).

In our study, drug poisonings represented the first place among all poisonings presented to the emergency department, at 31.2%, and the results of our study were found to be similar to those in the literature. When examining the distribution of drug poisonings by age group, it is seen that younger patients predominate, taking into account the average age (Özayar et al. 2011, Sorge et al. 2015). Consistent with the literature, our study found that drug poisonings are more common in younger individuals. The high rates of drug poisoning in our country are thought to be due to the high rate of oral medication intake, misuse of medications, inadequate public knowledge about medications, and the easy accessibility of these medications without a prescription.

In our study, it was determined that mushroom poisoning was the most common cause of poisoning after drug ingestion. In a study conducted in our country, mushroom poisoning cases presented to the emergency room

were examined and it was reported that 86.01% of the cases were admitted to the hospital in June and May (Ünlüoğlu et al. 2003). In a study by Deniz et al. (2008), mushroom poisoning cases were reported to be more frequently presented in October and November. These findings indicate that there are regional differences in our country. In our study, mushroom poisoning was found to be most common in the autumn months (18.4%). This may be due to rural living, traditional eating habits, and cultural factors. Mushroom poisoning is among the serious clinical conditions that carry a risk of mortality and require intensive care if not treated early. In our study, 36 patients presented to the emergency room due to mushroom poisoning and were discharged after receiving treatment. In a retrospective study by Özdemir et al. (2004), 26 patients were followed up with a diagnosis of mushroom poisoning and only one patient had fulminant fever. reported that he died due to hepatic failure.

Many studies in the literature have reported that the most common route of exposure in poisoning cases is the oral route. Deniz et al. (2009) reported that 83.9% of patients were exposed to the toxic substance orally. Similarly, Kavalcı et al. (2006) reported this rate as 75.2%. Consistent with the literature, our study found that the most common route of exposure was largely oral (72%). Considering that not only drugs but also foods, fungi, corrosives, and chemicals are ingested orally, this finding is considered an expected result.

In the literature, it has been observed that suicidal poisonings are more common than accidental poisonings. A study by Yeşil et al. (2008) found a suicide rate of 53.7%, and a study by Özayar et al. (2011) found that the vast majority (87%) were suicidal poisonings. A study by Sönmez et al. (2012) reported 64%, Aydın et al. (2020) 74.7%, and Büyükçavuşoğlu et al. (2023) 60% of poisonings were due to suicide attempts. However, our study indicates that accidental poisonings are more common.

In our study, 73.6% of emergency department poisoning admissions were accidental, the leading cause. Other studies in the literature also reveal similar results. For example, in a study examining poisoning cases presenting to the emergency department by Demirel et al. (2020), accidental poisoning was found to be the most common cause (85.2%). In a study by Kavalcı et al. (2006), accidental poisoning was found to be the most common cause, at 58.27%. In another similar study by Yılmaz et al. (2013), this rate was found to be 63.6%, the leading cause. Our study was consistent with the studies cited above regarding accidental poisoning admissions to the emergency department.

The mortality rate due to poisoning was found to be 2.5% in the study conducted by Akköse et al. (2006), 0.4% in the study conducted by Yılmaz et al. (2006), 2.5% in the study conducted by Mert et al. (2006), 0.92% in the study conducted by Özayar et al. (2011), and 4.8% in the study conducted by Aydın et al. (2020). All cases in our study were discharged with recovery, and no fatalities were observed.

CONCLUSION AND RECOMMENDATIONS

The study findings revealed that nearly half of emergency room poisoning cases were in individuals under the age of 30. Some poisonings exhibited seasonal characteristics, occurring more frequently in the third quarter of the day. An evaluation of the poisoning factors revealed that drug-related poisonings were the most common cause. The poisoning was most commonly ingested, with a higher prevalence in the under-15 age group.

It is understood that the majority of poisoning cases occur accidentally, and while accidental poisonings are more common in men, suicidal poisonings are more common in women.

In light of these results, it is recommended that preventive mental health services be activated within the scope of primary health care services to prevent drug poisonings, that healthcare professionals be equipped to provide counseling regarding poisonings, especially in emergency services, which are the first point of contact, and that both the public and healthcare professionals, starting from student life, be informed about the national poison hotline.

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CHAPTER 6

ARTIFICIAL INTELLIGENCE INTEGRATION IN CANCER SCREENING: CURRENT APPLICATIONS AND FUTURE PERSPECTIVES

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Çiğdem ŞEN TEPE[2]

Abstract

Cancer is one of the leading causes of death worldwide, and the number of cases is expected to increase, especially in low- and middle-income countries. Early diagnosis increases treatment success, and artificial intelligence (AI) applications are increasingly gaining importance in this area. The aim of this study is to provide a comprehensive overview of digital cancer screening systems and examine the role of AI in increasing diagnostic accuracy and efficiency. By reviewing the literature, studies on breast, colorectal and cervical cancer screening, which are three common cancer types and for which free screening programs are carried out in our country, were examined and the effect of AI-supported decision support systems was revealed.

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AI is effectively used in areas such as medical imaging, lesion classification and evaluation of personal health data. Wearable technologies provide access to individual health data, and these data can be analyzed with AI to develop early warning systems. Breast cancer is the most common type of cancer worldwide. Early diagnosis and prevention of deaths in breast cancer are possible with screening programs and diagnostic tests. In breast cancer screenings, AI supports radiologists in interpreting mammography images; it reduces false positive and negative results. In colorectal cancer, AI accuracy rates have increased in detecting small polyps during colonoscopy. AI systems are also used in detecting cancer mutations and treatment planning. AI has shown good results in calculating drug doses and showing the presence of polyps that are too small to be missed. In cervical cancer, AI increases efficiency in the analysis of HPV tests and digital colposcopy images, speeds up pathological examinations. It reduces unnecessary expenditures in the field of health and saves time. AI algorithms developed in recent years can also partially replace pathology services in low-resource countries. The first FDA-approved digital cytology system was launched in 2024, accelerating developments in this field.

As a result, AI stands out as a cost-effective and time-saving tool that supports early diagnosis in cancer screenings, but research is still needed in terms of clinical accuracy and ethical aspects. In the future, it is important to increase the reliability of AI systems, ensure patient safety and consider economic sustainability.

Keywords: Artificial Intelligence, Cancer Screening, Digital Health, Early Diagnosis

Introduction

Cancer is among the leading causes of death worldwide. According to the World Cancer Report, the number of cancer cases is expected to rise with the rapid growth and aging of the global population, with low- and middle-income countries being disproportionately affected. Early detection of cancer significantly increases treatment success (Şentürk et al., 2025; Tolunay, 2021). In this context, various technological approaches are being adopted to improve early diagnosis and treatment processes in healthcare. One of these approaches is the application of artificial intelligence (AI).

AI has become increasingly utilized in the healthcare field, especially in our rapidly evolving world. Over the past decade, AI has played a significant role in medical and healthcare systems (Akalın & Veranyurt, 2021). AI refers to systems such as robots, computers, and software that are designed based

on the functions of the human brain. In healthcare, AI can be used in medical imaging, cancer screening and diagnosis, lesion classification, and more (Celayir, 2025).

The development of AI in healthcare is rooted in a historical process. AI was first introduced in 1956 (Bhinder et al., 2024), and began entering the healthcare sector in the 1970s. AI-assisted wearable technologies allow access to personal health data and offer a cost-effective, non-invasive way to facilitate early diagnosis. Many people worldwide use wearable technology integrated with smartphones to monitor health metrics like heart rate, sleep patterns, and physical activity. These technologies are noteworthy for their contributions to patient monitoring and predicting complications in advance. However, concerns remain about the clinical accuracy of such data and the potential for delays in patients seeking timely medical care.

Experts also highlight AI's contributions to healthcare systems. Cardiologist Dr. Eric Topol has advocated for the use of AI in tasks such as medical imaging, heart monitoring, and access to patient records, arguing that AI enables rapid data aggregation, early diagnosis, and optimized treatment planning. This in turn accelerates hospital workflows, reduces errors, and saves time (Uzun, 2020). Economically, AI's impact on healthcare is significant. According to the OECD, around 20% of global healthcare spending is wasted—due to incorrect diagnoses, unnecessary treatments, and excessive costs (Uzun, 2020; Bhinder et al., 2024).

Comparative studies evaluating AI's clinical accuracy against healthcare professionals are also of interest. In one study, a general concordance rate of 79% was found between AI and specialists. In a multicenter test involving eight radiation oncologists from seven hospitals, AI outperformed half the doctors and matched the others. The study also found that AI assistance led to improvements in contouring accuracy for five of the eight physicians, with a 54.5% reduction in interobserver variation and a 39.4% decrease in contouring time (Huynh et al., 2020).

Artificial Intelligence in Breast Cancer Screening

AI's contributions to breast cancer diagnosis represent a significant advancement in healthcare technology. Breast cancer is the most commonly diagnosed cancer type globally. Early diagnosis and prevention of breast cancer-related deaths are made possible through screening programs and diagnostic tests. Since the 1980s, mammography has been the cornerstone of breast cancer detection.

However, due to a shortage of radiologists and inconsistencies in image interpretation among them, diagnostic accuracy may sometimes be compromised. In this context, AI has assumed a substantial role in medical imaging by enabling the storage of digital data and rapid image processing. AI assists radiologists in interpreting medical images and making diagnostic decisions.

McKinney et al. developed an AI system for breast cancer screening that was found to reduce both false-positive and false-negative results (Dembrower et al., 2023). Similarly, studies from various countries support the effectiveness of AI. In a study conducted between 2012 and 2015 involving 6,625 mammograms from two hospitals in Stockholm, it was observed that AI-assisted double reading led to a 2% higher cancer detection rate compared to traditional double reading by two radiologists (Dembrower et al., 2023; Díaz et al., 2024).

The success of AI in breast cancer diagnosis has also been demonstrated in different international centers. For instance, a study conducted at a Cancer Center in India showed high compatibility using the AI system "Watson for Oncology." Similarly, in Australia, AI was found to detect more cancers than radiologists (Waugh et al., 2024). In addition, a 2018 study by Whitney et al. used AI to predict recurrence risk in breast cancer patients (Whitney et al., 2018).

These findings suggest that using AI alongside radiologists in interpreting mammograms reduces workload and speeds up accurate diagnoses. Some experts have even proposed using AI as a triage tool to reduce false positives (Waugh et al., 2024). However, the abundance of AI-based breast imaging systems on the market has created confusion regarding which algorithm to adopt in clinical settings (Ha et al., 2019).

The Breast Cancer Surveillance Consortium has suggested consolidating clinical performance criteria to accelerate the implementation and regulation of AI algorithms in clinical environments (Dembrower et al., 2023; Díaz et al., 2024).

AI Applications in Colorectal Cancer

AI's role in colorectal cancer (CRC) is expanding rapidly. Colorectal cancer ranks as the third most common cancer among both men and women and accounts for a significant proportion of cancer-related deaths worldwide. Colonoscopy remains the primary method for detecting colorectal polyps during screening.

AI technologies are now being employed to increase accuracy and enable early detection during colonoscopies. It has been observed that even patients with initially clear colonoscopy results may develop cancer later. AI-assisted colonoscopies enhance the identification of small polyps that may otherwise be overlooked. While the detection of more small polyps can help identify cancer earlier, it also raises concerns about overdiagnosis.

To ensure accurate, sensitive, reliable, and early detection, new AI-driven software models are being developed. In addition, AI is increasingly integrated with robotic surgery and computer-aided drug administration systems. Chang and colleagues conducted a study using AI to analyze mRNA data from cancerous tissues and aimed to develop potential new drugs based on these findings.

AI has also demonstrated high accuracy in identifying cancer-related mutations and predicting recurrence rates in colorectal cancer (Athanasia Mitsala et al., 2021). These developments highlight the increasing importance of AI not only in diagnosis but also in personalized treatment planning for colorectal cancer patients.

AI in Cervical Cancer Screening

The impact of artificial intelligence in women's health is becoming increasingly prominent, particularly in the early detection of cervical cancer, one of the leading causes of cancer-related deaths among women. Cervical cancer is primarily associated with HPV (Human Papillomavirus) infection. The World Health Organization has emphasized that cervical cancer can be detected early through HPV testing (Hou et al., 2022).

The use of AI in cervical screening has improved both the speed and accuracy of the analysis processes. AI shows promising results in analyzing cervical cytology and has increased the efficiency of HPV testing fourfold (Xu et al., 2024). For patients with positive HPV test results, colposcopy is performed for definitive diagnosis (Bedell et al., 2020). Colposcopy involves magnifying the cervix by 5 to 40 times, providing detailed visual examination (Hou et al., 2022).

Using AI to analyze images obtained through colposcopy offers advantages in terms of improved evaluation and permanent data storage. Recent research aims to integrate high-resolution colposcopy imaging with AI software to enhance screening outcomes. Ultra-high-definition digital colposcopies provide significantly enlarged images, allowing for more precise cervical

surface evaluation. These images can also be used for educational purposes and stored electronically for patient documentation.

Additionally, such digital images can be reviewed in quality control programs and transmitted electronically for telemedical consultations with specialists. Current studies continue to explore the interpretation of digital colposcopic images using AI algorithms (Bedell et al., 2020).

There are also real-world implementations of these technologies in the field. For example, a collaborative project between the University of Helsinki and Kinondo Health Centre in Kenya has led to the development of an AI-based system that shortens screening times and helps address regional shortages of medical experts. Researchers at the University of Helsinki's Institute for Molecular Medicine, in cooperation with the Kinondo Health Centre, developed an AI program that automatically analyzes Pap smear samples to detect abnormal cells before cancer develops.

Dr. Harrison Kaingu, director of the Kinondo clinic, expressed his anticipation for broader implementation of the program, especially since the region has a shortage of pathologists. The system uses inexpensive, handheld microscopes to scan Pap smears, uploads the images to a server, and processes them with AI to identify abnormal cells.

According to researchers, the AI algorithm missed only about 5% of abnormal samples out of 720 cases collected at Kinondo Health Centre, though it produced about 15% false positives. The system effectively pre-processes and flags suspicious areas, allowing pathologists to review only those targeted regions, thus saving time and resources. Following this project, similar AI-based programs are being considered for diagnosing other diseases like breast cancer in Tanzania (Wetsman, 2019).

FDA Approval and Regulation of AI-Based Technologies

The clinical use of AI technologies in healthcare also depends heavily on regulatory approval and oversight. In February 2024, the first FDA-approved digital cytology system, the **Genius™ Digital Diagnostics System**, was launched, marking a major milestone in AI-assisted cervical cancer diagnostics. This system significantly advanced imaging and analysis processes by integrating artificial intelligence into digital cytology workflows (Shen et al., 2023).

The system enables the acquisition and analysis of digital images using AI. These images can be stored and accessed remotely by expert clinicians,

facilitating second opinions and telemedicine consultations. It also contributes to improving diagnostic accuracy, enhancing efficiency, and ensuring data security.

The regulatory support for such innovations highlights the growing trust in AI-based medical technologies and encourages their wider adoption in clinical environments. However, as the integration of AI into healthcare continues, ensuring transparency, data protection, patient safety, and ethical use of AI tools will remain essential considerations.

Conclusion and Recommendations

The integration of artificial intelligence into cancer screening significantly enhances early diagnosis and diagnostic accuracy, yet also introduces ethical and regulatory challenges in clinical applications. Bringing together various AI-based diagnostic tools may help form more robust and reliable algorithms.

Future research should prioritize the clinical validation of AI algorithms, with particular attention to patient safety, data privacy, and economic sustainability. It is also essential to evaluate how these technologies can be adapted to low-resource settings, ensuring equitable access and minimizing disparities in healthcare.

Overall, while AI shows considerable promise as a cost-effective and time-saving tool in cancer screening, it must be integrated thoughtfully—guided by evidence, ethics, and regulatory frameworks. Continued interdisciplinary collaboration among clinicians, researchers, technologists, and policymakers will be vital to ensure the safe and effective deployment of AI in global cancer care.

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CHAPTER 7

THE RELATIONSHIP BETWEEN BALANCED LIFE AND PSYCHOLOGICAL WELL-BEING AND DEPRESSION, ANXIETY, AND STRESS IN THE CONTEXT OF POSITIVE PSYCHOTHERAPY

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Abstract

This study examined the effect of the balanced life model, widely used in positive psychotherapy, on psychological well-being, depression, anxiety, stress levels, and life satisfaction of students studying health. This

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descriptive study was completed with 219 student. The data were collected by sociodemographic data form, Balanced Life Scale (BLS), Psychological Well-Being Scale (PWS), Depression Anxiety Stress Scale (DASS-21), and Satisfaction with Life Scale (SWLS). It was found that there was a positive and moderate relationship between the achievement sub-dimension of the BLS and the PWS and SWLS, a moderate and weak negative relationship with depression and stress, and no relationship with anxiety scores. The achievement dimension significantly positively affected both psychological well-being and life satisfaction. Achievement significantly reduced depression and stress. Spirituality only considerably reduced stress levels but did not affect other variables. Relationships showed a positive and significant effect only on life satisfaction. As a result, it was determined that the psychological well-being and life satisfaction scores of the students participating in the study increased as the scores they obtained from the balanced life sub-dimensions increased; depression and stress scores decreased; and the balanced life model created explained psychological well-being, life satisfaction, depression and stress at varying rates.

Keywords: Anxiety, Balance Model, Depression, Positive Psychotherapy, Psychological Well-Being, Stress

Introduction

In four years, nursing and midwifery university students receive a formal education that includes theoretical and clinical applications, professional knowledge, and skills (Karaca et al., 2015). Nursing and midwifery students try to overcome many problems experienced by other university students, such as gaining independence, issues arising from university life, separation from family and familiar environment, new friendships, loneliness, economic problems, concerns about their future profession and working life, as well as problems such as fear of making mistakes in clinical practice, not feeling ready, early acquaintance with different patient groups and colleagues in the clinic, and negative prejudices of relatives towards the profession. In these cases, students may not cope effectively, feel powerless and helpless, and may even experience physical and mental health problems (Yildirim et al., 2021; M. Yılmaz et al., 2017). In the literature, studies are showing that university students experience intense stress in their educational lives and have high levels of depression and anxiety (Bayar et al., 2021; Köksal & Topkaya, 2021; Pesen & Mayda, 2020; M. Yılmaz et al., 2017). Therefore, effective methods are needed to protect students' mental health and maintain their psychological well-being.

In the psychology literature, many psychotherapy schools protect individuals' mental health and maintain and improve their well-being. Psychoanalytic therapies, behavioral therapies, cognitive therapies, and mindfulness-based therapies are examples of these therapies. Positive psychotherapy is among these approaches (Çaykuş & Eryılmaz, 2020). Positive psychotherapy was developed by Peseschkian and colleagues in Germany in 1968. Positive psychotherapy is a holistic approach built on the foundations of four main approaches. It combines psychodynamic, existential-humanistic, behavioral, and cultural therapy methods (Sarı, 2015). Along with these methods, it also includes unique intervention methods and adopts a conflict-solution-based approach. Positive psychotherapy consists of three basic principles: hope, balance, and consultation. According to positive psychotherapy, hope is believing that there is a way out, even in hopeless situations (Eryılmaz, 2020). The principle of hope is based on the belief that individuals can solve their problems, emphasizing their abilities and positively reinterpreting their problems (Aypay & Kara, 2018; Sarı, 2015). For example, depression is considered "the ability to react with deep emotionality, and loneliness is "a strong expression of the need to establish a relationship with other people"(Sarı, 2015). The consultation principle of positive psychotherapy consists of five steps that shape the therapy. The "observation" step in which the client defines the problem, the "inventory" step in which the causes of the client's problems are examined, the "situational encouragement step in which the client finds the positive aspects of the situation, alternative ideas and positive interpretation of the symptom, the "verbalization" step in which the client's conflicts are resolved and what the client can do to achieve balance, and the "expanding goals" step in which the client is prepared for the future constitute the consultation stage (Eryılmaz, 2020; Sarı, 2015). One of the principles of positive psychotherapy is the balance model. The balance model emphasizes that each person's life is lived in four dimensions: body/health (senses), work/success (mind), relationships (traditions), and future/hope/spirituality. Positive psychotherapy argues that it will be healthy when it provides balance in these four dimensions (Sarı, 2015). It can be said that positive psychotherapy is not only an approach that deals with psychopathology but also a psychotherapy theory that evaluates the individual holistically, supports their well-being, and aims to develop their capacities. Positive psychotherapy emphasizes that the balanced distribution of people's energies to the four areas of need in the balance model is a positive step for mental health (Aypay & Kara, 2018). For this reason, it was thought that the principle of balanced life would effectively protect students' mental health and maintain their psychological well-being.

It is noteworthy that the number of studies on positive psychotherapy, especially on the balance model, is limited both nationally and internationally. PPT-based balance model training with nursing students was found to significantly increase the subjective well-being levels of students (Güleç Keskin & Gülirmak, 2022). In the case presentation made by Demirbağ and Sarı, it was concluded that the client was enabled to realize a balanced life as a result of the counseling on the balance dimensions and that the client's rumination decreased, the power of self-recovery increased and felt better (Tuğba & Sarı, 2023). In the study by Kuzu Durmaz et al. (2024) examining the effect of the COVID-19 pandemic on the anxiety levels and balance dimensions of nursing students, it was concluded that the anxiety of the students increased in the changes in the balance dimensions. According to the results of Eryılmaz's (2015) study on the effectiveness of positive group psychotherapy applied to university students, depression symptoms and negative emotions decreased in individuals participating in the survey; positive emotions increased (Eryılmaz, 2015). Guo et al. (2016) found that an 8-week group positive psychotherapy program was effective in alleviating depression and increasing self-efficacy in Chinese nursing students (Guo et al., 2017)**.** A study conducted in Iran showed that positive psychotherapy was effective in reducing stress, anxiety, and depression among university students and increasing their well-being. Its effect was observed two months after the intervention (Khanjani, 2017).

In the literature, there is no study examining the relationship between the balanced dimensions of positive psychotherapy and psychological well-being, depression, anxiety, stress, and life satisfaction among nursing and midwifery students. The unique value of this study is that the balanced dimensions of nursing and midwifery students and psychological well-being, depression, anxiety, stress, and life satisfaction are examined together. The findings of this study have the potential to make important contributions to both the academic literature and professional practice. Given the academic and clinical difficulties and stress levels reported by students in these fields, understanding how positive psychotherapy can help them cope with academic and clinical difficulties will support the development of more targeted mental health interventions tailored to their specific needs. Furthermore, by exploring the efficacy of the balance model, this study may broaden the application of positive psychotherapy in educational settings and provide a holistic approach to mental health that addresses the diverse needs of students.

This study aims to examine the relationship between a balanced life and psychological well-being and depression, anxiety, stress, and life satisfaction

in the context of positive psychotherapy in nursing and midwifery students studying health.

Methods

Study Design

This study was conducted using a descriptive and correlational design.

Study Sample

The study was conducted between May and June 2023 among the nursing and midwifery students of a health sciences faculty in the Marmara region. The study population consisted of nurses and midwives. The sample consisted of 219 students who voluntarily agreed to participate in the study, calculated by the sampling method with 95% power and 90% confidence interval. Of the students who participated in the survey, 47.9% were nursing students, the mean age was 20.69±1.60, and the age range was 18-26 years. The sociodemographic data of the participants are given in Table 1.

Table 1. *Socio-demographic characteristics of the participants*

Variables		n	%
Gender	Woman	201	91.8
	Male	18	8.2
Section	Nursing	105	47.9
	Midwifery	114	52.1
Classroom	First	97	44.3
	Second	54	24.7
	Third	52	23.7
	Fourth	16	7.3
Marital status	Single	214	97.7
	Married	5	2.3
Economic situation	Income less than expenditure	44	20.1
	Income equals expenditure	143	65.3
	Income more than expenditure	32	14.6
Cigarette Use	Yes	32	14.6
	No	187	85.4
Alcohol Use	Yes	14	6.4
	No	205	93.6

Data Collection Tools

The data were collected by sociodemographic data form, Balanced Life Scale (BLS), Psychological Well-Being Scale (PWS), Depression Anxiety Stress Scale (DASS-21), and Satisfaction with Life Scale (SWLS).The

sociodemographic data form includes age, gender, department, marital status, economic status, smoking, and alcohol use.

Balanced Life Scale (BLS): The balanced life scale was developed by Aypay and Kara (2018) within the framework of the balance model, which forms the building blocks of the balance principle, one of the three basic principles of Positive Psychotherapy. It has four sub-dimensions aiming to measure the performance of individuals and how balanced they distribute their energy to four areas of need (achievement, spirituality, relationship, and body). There are no reverse-scored items. Items 1, 2, 3, 4, 5, and 6 are "Achievement/Career," 7, 8, 9, and 10 are "Relationship," 11, 12, 13, 14, 15, 16, 17, and 18 are "Spirituality/meaning", 19, 20 and 21 are "Body" sub-dimensions. The four-point Likert-type scale is scored as Completely agree = 4, Moderately agree = 3, Somewhat agree = 2, Strongly disagree = 1. As the average score obtained from each sub-dimension increases, the balanced life levels of the participants increase. Cronbach's alpha reliability coefficient values of the sub-dimensions of the scale were found as success 0.84, spirituality 0.91, relationship 0.86, and body 0.74 (Aypay & Kara, 2018). In this study, Cronbach's alpha reliability coefficient values are success 0.90, relationship 0.89, spirituality 0.94, and body 0.85.

Psychological Well-Being Scale (PWS): The Psychological Well-being Scale was developed by Diener et al. (2010) to complement existing well-being measures and to measure socio-psychological well-being. Its adaptation into Turkish was conducted by Telef (2013). The items on the scale are answered between 1-7 as strongly disagree (1) and strongly agree (7). There are no reverse items. The minimum score is 8, and the maximum score is 56. A high score indicates that the individual has many psychological resources and power. Cronbach's coefficient obtained in the reliability study of the scale was calculated as 0.80 (Telef, 2013). In this study, Cronbach's alpha coefficient was found to be 0.92.

Depression Anxiety Stress Scale (DASS-21): DASS developed by Lovibond and Lovibond consists of 42 items. Yılmaz, Boz, and Arslan conducted the Turkish adaptation of DASS-21 in 2017; in the scoring of the scale, depression 0-4 points, anxiety 0-3 points, stress 0-7 points are normal level; depression was 5-6, anxiety 4-5, stress 8-9 points are mild level; depression 7-10, anxiety 5-7, stress 10-12 points are moderate level; depression 11-13, anxiety 8-9, stress 13-16 points are advanced level; depression 14 and above points, anxiety ten and above points, stress 17 and above points indicate having a very advanced problem. (Ö. Yılmaz et al.,

2017) For this study, Cronbach Alpha values of the scale were determined as depression 0.88, anxiety 0.80, and stress 0.81.

Satisfaction with Life Scale (SWLS): The scale adapted into Turkish by Köker was developed by Diener et al. (1985). Dağlı and Baysal (2016) adapted the seven-point Likert scale into a five-point Likert scale and conducted validity and reliability studies again. The response format for each item is "1= not at all appropriate" and "5= very appropriate". The lowest score that can be obtained from the current scale is five, and the highest score is 25. A low score indicates low life satisfaction. Cronbach's alpha value of the scale was determined as 0.88. (Dağlı & Baysal, 2016) For this study, Cronbach's Alpha value was 0.88.

Analyzing the Data

SPSS 25 program was used to analyze the data in the study. In statistical analyses, numbers, percentages, means, standard deviations, independent t-tests, one-way variance (ANOVA) analyses, and Pearson correlation analyses were used. To determine the normal distribution, it was accepted that skewness and kurtosis coefficients should be within ±1 limits, and the indices of skewness and kurtosis should be within ±1.96 limits. In regression analysis, modeling was performed with multiple regression analyses. The results were evaluated at a 95% confidence interval and $p<0.05$ significance level.

Ethical Approval of the Research

In this study, all rules specified in the "Directive on Scientific Research and Publication Ethics of Council of Higher Education Institutions" were followed. None of the actions specified under the second part of the Directive, "Actions Contrary to Scientific Research and Publication Ethics", have been carried out.

Ethics committee permission information: Name of the ethics review board: Sakarya University Ethics Committee**.** Date of ethical assessment decision:07/04/2023. Ethics assessment certificate number : E-61923333-050.99-236241.

Results

The results of the Pearson correlation analysis to examine the relationship between the scales are given in Table 2. Correlation coefficients between 0.01-0.29 indicate a low correlation, and between 0.30-0.70 indicate a

moderate correlation. Accordingly, it was determined that the achievement sub-dimension of the BLS was positively correlated with the body (r=.411), relationship (r=.601), spirituality (r=.431) sub-dimensions; the body sub-dimension was positively correlated with the relationship (r=.581), spirituality (r=.634) sub-dimensions; and the relationship sub-dimension was positively correlated with the spirituality (r=.585) sub-dimension at a moderate level ($p<0.01$). There was a weak and moderate positive correlation ($p<0.01$) between the achievement sub-dimension of the BLS and the PWS (r=.285) and the SWLS (r=.375); there was a moderate and weak negative correlation ($p<0.01$) with depression (r=-.363; $p<0.01$) and stress (r=-244; $p<0.05$), and there was no correlation between anxiety scores ($p>0.05$). There was a positive, low-strength relationship between the body sub-dimension of the BLS and the scores of the PWS (r=.256) and the SWLS (r=.252) ($p<0.01$), and a negative, weak and medium strength relationship between the body sub-dimension and the scores of depression (r=-306), anxiety (r=-.227), and stress (r=-.221) ($p<0.01$). There was a weak and moderate positive relationship ($p<0.01$) between the PWS (r=.289) and the SWLS (r=.375) scores of the relationship sub-dimension of the BLS and a weak and moderate negative relationship ($p<0.01$) between the depression (r=-.308; $p<0.01$), anxiety (r=-.118; $p<0.05$) and stress (r=-.183; $p<0.05$) scores. It was determined that there was a positive and weak relationship ($p<0.01$) between spirituality and PWS (r=.187) and SWLS (r=.290) scales ($p<0.01$); there was a negative and weak relationship between depression (r=-312), anxiety (r=-.176; $p<0.01$) and stress (r=-.265; $p<0.01$).

Table 2. *Evaluation of the relationship between the total and sub-dimensions of the BLS, PWS, depression, anxiety, stress, and SWLS*

		1	2	3	4	5	6	7	8	9	10
1. Success	**r**	1									
2. Relationship	**r**	.601*	1								
3. Spirituality	**r**	.431*	.585*	1							
4. Body	**r**	.411*	.581*	.634*	1						
5. BLS	**r**	.753*	.822*	.874*	.761*	1					
6.PWS	**r**	.285*	.289*	.187*	.256*	.299*	1				
7. Depression	**r**	-.363*	-.308*	-.312*	-.306*	-.398*	-.362*	1			
8. Anxiety	**r**	-.189*	-.118	-.176*	-.227*	-.216*	-.179*	.615*	1		
9. Stress	**r**	-.244*	.183*	-.265*	-.221*	-.291*	-.214*	.731*	.740*	1	
10. SWLS	**r**	.375*	.375*	.290*	.252*	.397*	.563*	-.461*	-.195*	-.277*	1

*Correlation is significant at the 0.01 level (2-tailed). BLS: Balanced Life Scale, PWS: Psychological Well-Being Scale, SWLS: Satisfaction with Life Scale

Multiple Regression Analysis Results

The results of multiple regression analyses related to the prediction of balanced life sub-dimensions on psychological well-being, depression, anxiety, stress, and life satisfaction levels are presented in Table 3. According to the regression analysis, the model is significant in explaining the effect of independent variables on psychological well-being ($p < 0.001$). The variables in the model have an explanatory rate of 11.4% on PWS. Achievement ($\beta = 0.168$, $p = 0.040$) is a significant predictor and positively affects psychological well-being. Achievement is a significant predictor and positively affects psychological well-being. Spirituality ($\beta = -0.057$, $p = 0.521$), relationship ($\beta = 0.139$, $p = 0.142$) and body ($\beta = 0.143$, $p = 0.107$) are not significant predictors. These results show that individuals' achievement levels have a significant positive effect on psychological well-being. However, spirituality, relationships, and body dimensions do not have a significant effect.

According to the regression analysis to explain the effect of independent variables on depression, the model is significant ($p < 0.001$). The variables in the model have an explanatory rate of 17% for depression. Achievement ($\beta = -0.253$, $p = 0.001$) is a significant predictor and affects depression negatively. Spirituality ($\beta = -0.119$, $p = 0.168$), relationship ($\beta = -0.018$, $p = 0.840$) and body ($\beta = -0.116$, $p = 0.177$) are not significant predictors. As the level of achievement increases, depression levels of individuals decrease significantly. However, spirituality, relationships, and body variables do not significantly affect depression.

According to the regression analysis, the model is significant in explaining the effect of independent variables on anxiety ($p < 0.01$). The variables in the model have an explanatory rate of 6.3% on anxiety. Body ($\beta = -0.168$, $p = 0.055$) is a borderline significant predictor. Spirituality ($\beta = -0.111$, $p = 0.137$) and achievement ($\beta = -0.021$, $p = 0.809$) are not significant predictors. While body dimension has a borderline significant effect on anxiety, achievement, and spirituality, do not show significant effects.

According to the regression analysis to explain the effect of independent variables on stress, the model is significant ($p < 0.001$). The variables in the model have an explanatory rate of 9.5% on stress. Spirituality ($\beta = -0.184$, $p = 0.042$) and achievement ($\beta = -0.179$, $p = 0.030$) are significant predictors and affect stress negatively. Body ($\beta = -0.075$, $p = 0.403$) and relationship ($\beta = 0.076$, $p = 0.423$) are not significant predictors. As both spirituality and achievement levels increase, the stress levels of individuals decrease

significantly. However, the dimensions of the body and relationships do not significantly affect stress.

According to the regression analysis to explain the effect of independent variables on life satisfaction, the model is significant ($p < 0.001$). The variables in the model have an explanatory rate of 17% on life satisfaction. Achievement ($\beta = 0.224$, $p = 0.005$) and relationship ($\beta = 0.195$, $p = 0.032$) are significant predictors and positively affect life satisfaction. Spirituality ($\beta = 0.082$, $p = 0.337$) and body ($\beta = -0.006$, $p = 0.948$) are not significant predictors. Achievement and relationships significantly affect life satisfaction; as achievement and relationships increase, life satisfaction also increases. However, spirituality and body dimensions do not significantly affect life satisfaction.

In this analysis, the achievement dimension significantly positively affected psychological well-being and life satisfaction. In addition, achievement had significantly decreasing effects on depression and stress levels. Spirituality significantly decreased only the stress level but did not affect other variables. Relationships showed a positive and significant impact only on life satisfaction.

These findings suggest that individuals' sense of achievement significantly predicts general well-being, life satisfaction, and stress, but other variables (spirituality, body, and relationship) have more limited effects.

Table 3. *Results of Multiple Regression Analyses for the Prediction of PWS, Depression, Anxiety and Stress Levels and Life Satisfaction by Balanced Life Sub-dimensions*

PWS	***β***	**Standard Error**	**Beta**	**T**	**p**	
Constant	24.893	3.246		7.668	.000	R=0.337
Success	.389	.189	.168	2.063	**.040**	R^2 =0.114
Spirituality	-.092	.143	-.057	-.643	.521	Adjusted R^2
Relationship	.443	.301	.139	1.473	.142	=0.097
Body	.586	.362	.143	1.618	.107	F=6.873
						p= 0.000
Depression	***β***	**Standard Error**	**Beta**	**T**	**p**	
Constant	16.531	1.561		10.590	.000	R=0.413
Success	-.292	.091	-.253	-3.223	**.001**	R^2 =0.170
Spirituality	-.095	.069	-.119	-1.383	.168	Adjusted R^2
Relationship	-.029	.145	-.018	-.202	.840	=0.155
Body	-.236	.174	-.116	-1.354	.177	F=10.983
						p=0.00 0
Anxiety	***β***	**Standard Error**	**Beta**	**T**	**p**	

Constant	9.864	1.261		7.824	.000	R=0.251
Spirituality	-.099	.066	-.111	-1.491	.137	R^2 =0.063
Success	-.013	.054	-.021	-.242	.809	Adjusted R^2
Body	-.262	.136	-.168	-1.926	.055	=0.050
						F=4.809
						p=0.003
Stress	***β***	**Standard Error**	**Beta**	**T**	**p**	
Constant	13.034	1.378		9.462	.000	R=0.308
Spirituality	-.125	.061	-.184	-2.050	**.042**	R^2 =0.095
Body	-.129	.154	-.075	-.839	.403	Adjusted R^2
Success	-.175	.080	-.179	-2.186	**.030**	=0.078
Relationship	.102	.128	.076	.802	.423	F=5.624
						p=0.000
SWLS Total	***β***	**Standard Error**	**Beta**	**T**	**p**	
Constant	4.946	1.355		3.650	.000	R=0.424
Success	.226	.079	.224	2.871	**.005**	R^2 =0.170
Spirituality	.057	.060	.082	.962	.337	Adjusted R^2
Body	-.010	.151	-.006	-.065	.948	=0.155
Relationship	.271	.126	.195	2.156	**.032**	F=11.726
						p=0.000

PWS: Psychological Well-Being Scale, SWLS: Satisfaction with Life Scale

Discussion

In our study, in which the effect of balanced life on psychological well-being, depression, anxiety, and life satisfaction in the context of positive psychotherapy was investigated, significant relationships were determined between achievement, body, relationship, and spirituality, which are sub-dimensions of life balance, and psychological well-being, depression, anxiety, stress, and life satisfaction. Accordingly, as achievement, body, relationship, and spirituality scores increase, psychological well-being and life satisfaction increase, and depression and stress decrease. No significant difference was found only between achievement and anxiety scores. In addition, in our study, the effect of the model created from the dimensions of achievement, body, relationship, and spirituality (balanced life) on psychological well-being, life satisfaction, mental health problems, depression, anxiety, and stress, which are part of mental health, was examined. According to the results, the balanced life model of achievement, body, relationship, and spirituality explains 10% of psychological well-being, 15.5% of life satisfaction and depression, 5% of anxiety, and 8% of stress. When the correlation and regression results are analyzed, it is thought that balanced life positively affects the participants' mental health.

These results will be discussed separately for the four dimensions of life balance. Work-life is an essential mental health component; work-related activities constitute 1/3 of human life (Kuzu et al., 2018). Freud emphasized the importance of working and producing for mental health by saying that people who love and create are healthy (Taşdemir, 2014). In our study, it was observed that the scores in the achievement dimension, which deals with an area related to working and producing, positively affected psychological well-being and life satisfaction, depression, and stress. Açıkgöz et al. (2024), in a study conducted with nursing students, found that the depression scores of students with high achievement ability, one of the secondary skills of positive psychotherapy, decreased. Similarly, Eryılmaz (2016) revealed that the achievement dimension of people diagnosed with depression was underdeveloped(Eryılmaz, 2016). Sinici et al. (2014) found that depression scores increased as achievement ability decreased in trauma patients (Sinici et al., 2014). In addition, our study found no relationship between achievement and anxiety. Work creates an environment that provides a livelihood, confidence, a sense of purpose and achievement, positive relationships, and the opportunity to be included in a community, as well as many other advantages, as well as structured routines for the individual and supports mental health with these aspects (Mental health at work, 2024). For students who are not employed, work includes activities related to school and education. Educational activities, which are a part of the future working life, provide nursing students with a sense of achievement and motivation, confidence, and social relationships while providing an opportunity for self-realization. For this reason, the time and energy allocated to school and education-related activities are thought to nourish students' sense of achievement, motivation, and confidence.

As it is known, there is a strong relationship between physical health and mental health. Our study revealed the positive effect of the time allocated to the body, i.e., sports, healthy nutrition, regular sleep, etc., on mental health. Body-oriented behaviors such as sports, healthy eating, and sleep are among the most essential components of life. They positively affect the individual's psychological well-being and reduce the risk of developing psychiatric disorders (Mavrandrea & Gonidakis, 2022; Rudolph, 2017). In addition, many studies reveal the positive effects of healthy nutrition (Kaba, 2019), sports (Bal & Aras, 2020; Şenişik & Kayiş, 2021; Söyler et al., 2022), and sleep (Akkuş et al., 2023; Ermiş et al., 2022) on psychological well-being, depression, anxiety, stress, and quality of life. Based on these results, it can be said that a healthy body is a part of healthy mental health; therefore, investing in the body will contribute to mental health.

One dimension of a balanced life is relationships. Our study found that increasing scores in the relationship dimension of a balanced life positively affected life satisfaction. Human is a biopsychosocial creature (Balci, 2019). Social life is a part of health. The relationship dimension of the balance model reflects the characteristics of human social life in positive psychotherapy. The results of our study show that the scores obtained in the relationship dimension positively affect mental health. Studies in the literature also support this result. Studies on loneliness, which also means the lack of relationships (Kahraman, 2018; Seki & Bayam, 2022), show that loneliness is associated with stress, anxiety, depression, and marital satisfaction, which is a part of life satisfaction.

In our study, the spiritual dimension of a balanced life was predictive of stress. The spiritual dimension of positive psychotherapy examines not only religious belief but also meaning, ideals, hope, and future plans. In the literature, it is stated that religious belief prohibits negative behaviors and instead develops positive emotions such as hope, trust, patience, tolerance, and empathy and contributes to psychological well-being (Pür, 2022); it supports the individual in coping with stress and finding meaning and purpose (Polat, 2022). Another study reported that positive religious coping strategies positively affect life satisfaction. The results of studies conducted during the COVID-19 pandemic also reveal the importance of spirituality in human life and mental health. In these studies, it is stated that unmet spiritual needs cause stress and anxiety, and religious belief is a protective factor for mental health (Figen, 2020; Poudel & Subedi, 2020).

As a result of our study, it was determined that psychological well-being and life satisfaction scores increased as the scores of nursing and midwifery students from the balanced life sub-dimensions increased; depression and stress scores decreased, and the balanced life model created explained psychological well-being, life satisfaction, depression, anxiety and stress at varying rates.

Based on these results, it is recommended that the use of the balance model of positive psychotherapy in mental health promotion studies for nursing and midwifery students should be made widespread awareness studies should be carried out on this subject, and mixed and experimental studies should be conducted to reveal the effectiveness of positive psychotherapy methods.

Conclusion

As a result, this study revealed that the balanced life model has positive effects on both psychological well-being and life satisfaction and also

reduces depression and stress levels; this shows that the psychological health of nursing and midwifery students studying in the field of health improves and their life satisfaction increases with the increase in their scores from the balanced life sub-dimensions. This finding encourages the integration of balanced life programs and positive psychotherapy methods that support the holistic health of nursing and midwifery students. Seminars, workshops, or group therapies organized in schools can help students to gain competence in these four dimensions. Future research should be replicated in different populations and cultural contexts to gain a more comprehensive understanding of these relationships. In conclusion, the study's findings emphasize the importance of developing strategies to enhance the psychological well-being of nursing and midwifery students. For nurses and midwives who provide holistic and individualized care in clinical settings, the balance model will facilitate the discovery of the areas in which individuals have problems and the identification of their needs, thus facilitating the provision of professional and holistic care services.

Limitations of the study

The sample consisted of nursing and midwifery students from a single health sciences faculty in the Marmara region of Turkey. This limits the generalizability of the findings to other educational contexts. The study employed a cross-sectional design, which captures data at a point in time. This limits the ability to draw causal inferences regarding the relationships between the balanced life dimensions and psychological well-being, depression, anxiety, stress, and life satisfaction. Longitudinal studies would be beneficial for assessing the changes over time and better understanding the directionality of these relationships. The data collected relied on self-reported measures, which may be subject to bias, including social desirability and recall biases. Participants may have overestimated their well-being or underreported symptoms of depression, anxiety, and stress, potentially skewing the results.

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CHAPTER 8

NURSING CARE AND APPLICATION CRITERIA USED IN THE CLINICAL FOLLOW-UP PROCESS OF VACUUM- ASSISTED WOUND CLOSURE THERAPY

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ABSTRACT

Introduction: Vacuum-Assisted Closure (VAC) therapy is an effective treatment method for the management of surgical and chronic wounds. VAC therapy is preferred to increase tissue perfusion, reduce oedema, lower the risk of infection, and support granulation tissue formation. In VAC therapy, in addition to a multidisciplinary team approach, nurses' systematic observation and care play an important role in wound healing. This article

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aims to develop a checklist approach to standardise daily clinical follow-up and care processes to improve the quality of care provided by nurses during VAC therapy and to define literature-based criteria.

Method: The current literature on VAC applications was reviewed, and standardised protocols were examined by clinical guidelines and manufacturer recommendations. The protocols were evaluated in terms of wound type, application process, dressing change frequency, and follow-up criteria.

Findings: VAC therapy supports wound healing by applying negative pressure. When looking at applications in the literature, the following topics stand out: determining indications/contraindications, wound assessment, appropriate material selection, pressure adjustment monitoring, appropriate dressing intervals, pain management, infection and complication monitoring, patient education and information, and device monitoring and safety.

Conclusion: To achieve successful results in VAC therapy, it is important to integrate application protocols into the nursing care process and adopt a systematic monitoring-based approach.

Keywords: VAC Therapy, Negative Pressure, Wound Care, Surgical Nursing, Protocol

Introduction

Vacuum-assisted wound closure (VAC) therapy is an effective treatment method for surgical and chronic wounds (Gao et al., 2021). VAC therapy, which is particularly used in complex and chronic wounds, is preferred to increase tissue perfusion, reduce oedema, lower the risk of infection, and support granulation tissue formation (Wound Management & Prevention, n.d.). Wounds caused by conditions such as diabetes mellitus, hypertension, and a weakened immune system do not tend to heal on their own (Astasio-Picado et al., 2022). Therefore, negative pressure used in VAC therapy is a type of therapy that aids in wound healing as a result of chronic wounds (Johns Hopkins Medicine, n.d.). When the device is properly placed on the wound, it reduces the air pressure in the wound, eliminating the pressure in the area where the wound is located. This helps the wound heal faster (Burhan et al., 2022).

Wounds usually heal within the first 4 weeks after they form (Hassan et al., 2021). Wounds that do not heal within this period (4-6 weeks) are referred to as ‘chronic wounds.’ They usually result from poor blood circulation, diabetes mellitus, or immune system deficiencies. Open wounds on the lower

leg are also known as venous leg ulcers (Cologne, 2025). Chronic wounds reduce patients' quality of life. The accompanying pain, bleeding, infection, and other complications often prevent patients from continuing their care, lead to repeated hospitalisations, and increase costs (Hassan et al., 2021). Therefore, it is extremely important to treat patients with a multidisciplinary approach, providing comprehensive care that includes wound healing support, pain management, infection prevention, and psychological support (Cologne, 2025). Thus, in VAC therapy, nurses' systematic observation and care play an important role in wound healing. This article aims to develop a checklist approach to standardise daily clinical follow-up and care processes and to define literature-based criteria to improve the quality of care provided by nurses during VAC therapy.

History and Pathophysiology of VAC Therapy

VAC therapy is a non-invasive method that can be used in acute and chronic wounds as well as in the healing of surgical wounds (Miyanaga et al., 2023). This method, which is generally used in the treatment of wounds without necrotic tissue, uncontrolled bleeding, malignancy, and osteomyelitis, is mostly preferred in diabetic ulcers, pressure sores, incision dehiscence, and graft/flap areas (Normandin et al., 2021).

This method, used in wound care, first emerged in the 1900s and is still preferred today (Şahin, 2015). A review of the literature reveals that vacuum therapy was first used to treat soldiers wounded in war, and the system was subsequently developed into negative pressure vacuum therapy (Miller, 2014). VAC is indicated not only for acute/chronic and surgical wounds but also for diabetic foot ulcers, pressure ulcers, skin graft fixation, flap salvage, burns, crush injuries, sternal/abdominal wound dehiscence, fasciotomy wounds, extravasation wounds, and animal bites/frostbite (Agarwal et al., 2019; Şahin, 2015). However, malignant wounds, VAC application is contraindicated in patients with untreated osteomyelitis, fistulae to organs or body cavities, presence of necrotic tissue, and exposed arteries/nerves/anastomosis sites/organs (Agarwal et al., 2019).

Physiological mechanism of action of the VAC device

A wound is formed as a result of trauma caused by various reasons, leading to the disruption of anatomical, physiological, and functional continuity in living tissue (Bulut, 2019). Wound healing is a spontaneous process involving various cellular and vascular reactions, depending on the stage

of healing. Accordingly, the main stages of wound healing are haemostasis, inflammation, proliferation, maturation, and remodelling (Figure 1) (Bulut, 2019). In wounds that do not heal in time and whose healing stages cannot be completed, VAC is used to activate the phases and accelerate healing in the wound bed; it stabilises the wound bed, reduces the bacterial load of the wound, prevents oedema, increases tissue perfusion, and stimulates granulation and angiogenesis. As a result, the likelihood of primary closure and healing of the wound increases (Agarwal et al., 2019; Şahin, 2015; Yuşan, 2024).

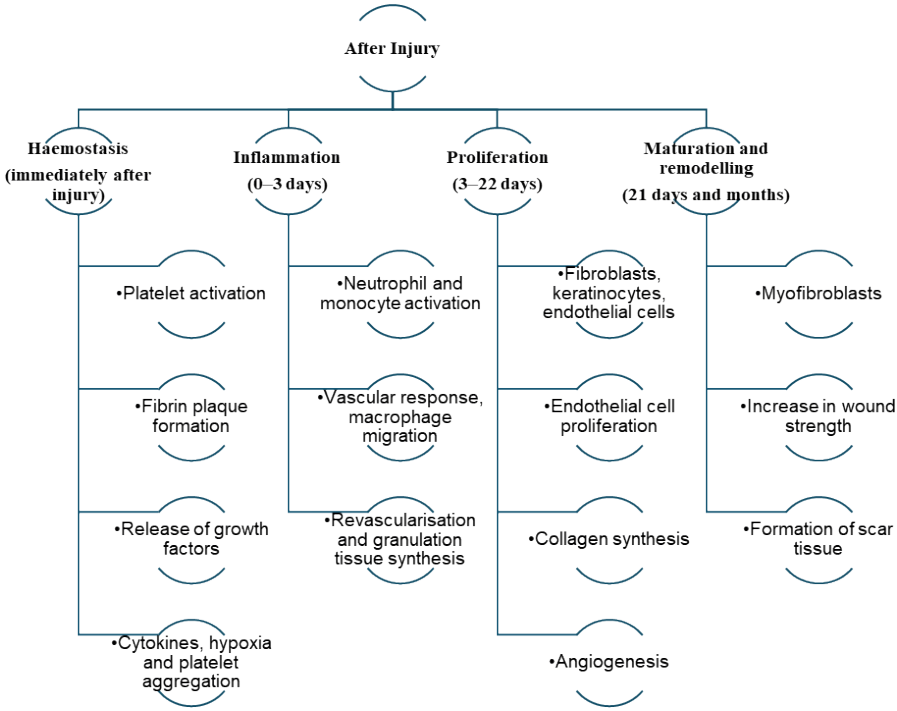

Figure 1. Stages of Wound Healing

The basic principle is to apply equal pressure to clean and chronic wounds to allow the fluid accumulated on the wound surface to be absorbed (Normandin et al., 2021). VAC application is based on ensuring adequate haemostasis at the wound site and dressing with foam after wound debridement. In general, Negative Pressure Wound Therapy (NPWT) and VAC systems consist of a porous sponge, an occlusive semi-permeable wound dressing material, and a tube connected to the wound that creates negative pressure. Consists of devices that function as motors/pumps (Şahin, 2015). These components are

placed on the wound surface in sequence (Figure 2) and contribute to wound healing through repeated cycles (Normandin et al., 2021).

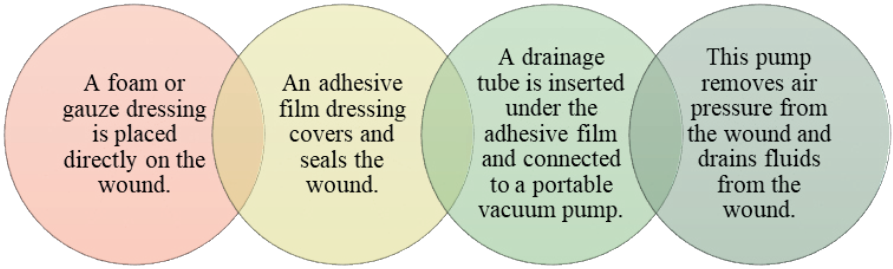
A foam or gauze dressing is placed directly on the wound.
An adhesive film dressing covers and seals the wound.
A drainage tube is inserted under the adhesive film and connected to a portable vacuum pump.
This pump removes air pressure from the wound and drains fluids from the wound.

Figure 2. Flow diagram of VAC device use

VAC primarily has four effects (Şahin, 2015; Yuşan, 2024). These are:

1. Contraction at the wound site - macrodeformation
2. Microstress-microdeformation at the foam-wound interface
3. Removal of fluid from the wound site - reducing oedema/exudate
4. Stabilisation of the wound site.

In addition to all these effects, secondary supports such as angiogenesis, granulation tissue formation, cellular proliferation, neurogenesis, and migration also occur at the wound site (Huang et al., 2014). First, a pulling force is created at the wound edges with the help of the foam placed on the wound surface and pressure. With this force, contraction develops in the wound, and the wound edges shrink (Astasio-Picado et al., 2022). The dressings used prevent the entry of microorganisms into the wound site while also allowing the wound to remain warm and moist. During this time, the oedema/excess exudate that develops in the wound impairs oxygenation, leading to ischaemia at the wound site (Hölper et al., 2024). VAC helps to eliminate the oedema/exudate, allowing the wound to re-perfuse and eliminating the risk of ischaemia (Yuşan, 2024). Thus, the risk of infection is reduced (pathogens and waste are removed from the environment), perfusion increases, tensile strength increases, and angiogenesis and cellular proliferation are provided (Şahin, 2015). Additionally, VAC increases cell division, bringing the wound edges closer together, promoting vascularisation, and activating epithelial growth factors in the granulation tissue, thereby accelerating healing in the wound bed (Astasio-Picado et al., 2022). There are contraindications for the use of VAC devices, which are employed to facilitate wound healing by

enabling all these steps. Examples of such conditions include untreatable osteomyelitis, non-enteric or unexplored fistulas, severe peripheral artery disease, malignant neoplasms in the wound, etc. (Johns Hopkins Medicine, n.d.; Astasio-Picado et al., 2022). However, the use of VAC is recommended for chronic wounds such as diabetic foot ulcers, frostbite, and stage 3 and 4 pressure ulcers (Figure 3).

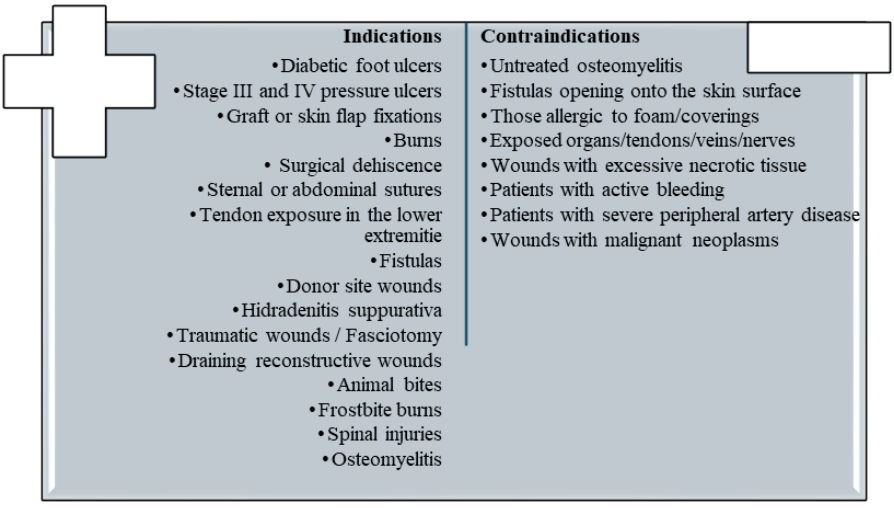

Figure 3. VAC treatment criteria

VAC therapy promotes wound healing but can sometimes cause complications. Among these complications, bleeding during sponge changes is the most common. This is due to the excessive growth of granulation tissue caused by growth factors. In addition, foul odour at the wound site, erosion at the wound edges, and infection are among the other most common complications. Therefore, when planning VAC therapy, VAC diagnostic criteria should be considered, and a multidisciplinary approach should be adopted.

VAC Therapy and Nursing Care

Florence Nightingale, the pioneer of the nursing profession, sought to improve environmental conditions in the care of wounded soldiers while also implementing significant reforms in hygiene and wound care (Turkowski & Turkowski, 2024). This process, which begins with sanitation of the wound surface and appropriate dressing, is now approached in modern nursing as a holistic approach involving wound assessment, infection

control, and collaboration between the patient, family, and nurse (Ham et al., 2022; Köşgeroğlu & Ünver, 2009; Taylan et al., 2012). In this context, innovations in wound care and advanced technology-based applications such as VAC therapy require nurses to update their technical knowledge and skills continuously. When examining the principles of VAC application in the literature, the following topics stand out: determining indications/ contraindications, wound assessment, appropriate material selection, pressure adjustment monitoring, appropriate dressing intervals, pain management, infection and complication monitoring, patient education and information, and device monitoring and safety (Astasio-Picado et al., 2022; Cologne, 2025; Hölper et al., 2024; Yuşan, 2024). Nursing monitoring criteria for VAC applications obtained from the literature are presented in Table 1.

Table 1. Literature-Based VAC Application Monitoring Criteria

Criterion Title	***Explanation***
VAC application assessment	***Indications (I) and contraindications (C) should be determined.*** ✓ I: Diabetic foot ulcers, pressure ulcers, traumatic wounds, surgical incision dehiscence, graft and flap areas. ✓ C: Malignant wound tissue, uncontrolled bleeding, untreated osteomyelitis, wounds where necrotic tissue has not been removed.
Wound assessment	***The presence of necrotic tissue, the amount of exudate, and the granulation should be observed.*** ✓ If necrotic tissue is present before VAC therapy, it must be debrided. ✓ Granulation tissue formation should be recorded regularly with photographs.
Material selection	***Foam and dressings appropriate for the characteristics of the wound should be selected.*** ✓ *The type of foam (polyurethane/hydrophilic/silver-containing) should be selected according to the characteristics of the wound.* ✓ *The foam should not extend beyond the wound edges and should not come into direct contact with the skin.* ✓ *The transparent film should be placed so that it is completely leak-proof.*
Pressure setting	***-75 to -125 mmHg, depending on the patient's condition.*** ✓ • General range: -75 to -125 mmHg. ✓ Low pressure (e.g., -75 mmHg): Preferred for painful or sensitive areas. ✓ Intermittent or continuous mode can be used.
Dressing frequency	***Every 48-72 hours, every 24 hours for infected wounds.*** ✓ Standard frequency: Every 48-72 hours. ✓ In infected wounds: Recommended every 24 hours. ✓ In flaps/grafts: No intervention may be required for the first five days (as per the surgeon's recommendation).

Leakage control	***There should be no air leakage in the transparent dressing.*** ✓ Transparent dressings should cover the entire wound surface and foam in an airtight manner. ✓ There should be no folds or gaps at the edges. ✓ If multiple pieces of film are used, the joints should be overlapped and sealed.

In this context, nursing care should be planned in terms of wound assessment and clinical observation, leak prevention, system setup and pressure adjustment, infection control, pain management, patient education, and psychosocial support. Nurses will also use reminder cards (Figure 4) and checklists (Table 2) in clinics, which will facilitate both care planning and wound monitoring.

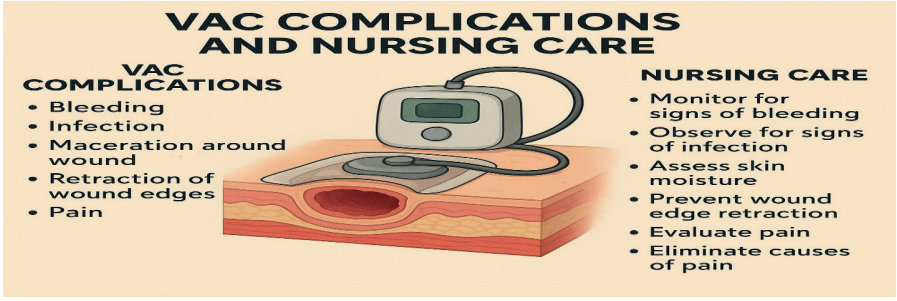

Figure 4. Sample reminder image (* prepared with the help of chatgpt)

Wound Assessment and Clinical Observation

Before VAC therapy, a systematic assessment is performed and recorded regarding the type of wound (acute/chronic), size, depth, signs of infection (redness, discharge, foul odour), and the condition of the surrounding tissues (Astasio-Picado et al., 2022; Hölper et al., 2024).

Sealing System Setup and Pressure Adjustment

To ensure the effectiveness of the VAC system, the foam placed on the wound must be appropriate for the wound and complete sealing is achieved with a transparent cover (Astasio-Picado et al., 2022). Nurses should regularly check the device and dressing to ensure airtightness and prevent air leakage. Additionally, pressure settings should be adjusted according to the patient's needs, and pressure should be monitored at frequent intervals. Particular attention should be paid to protecting the wound perimeter with barrier creams (Lindholm & Searle, 2016).

Infection Control

One of the potential complications during VAC therapy is the risk of infection (Hölper et al., 2024; Huang et al., 2014). Therefore, wound care nurses should follow the guidelines' recommendations regarding hand hygiene, the use of sterile materials, and the use and replacement of antimicrobial dressing materials (Hölper et al., 2024; Huang et al., 2014). Signs of infection should be monitored and recorded.

Pain Management

Pain is common in VAC therapy, especially during dressing changes (Gupta et al., 2016). The nurse should regularly assess the severity of pain and organise pain relief administration when necessary (Huang et al., 2014).

Patient Education and Psychosocial Support

The VAC device can also be used at home. In this case, the nurse should provide detailed education to the patient on topics such as device use, alarm signals, emptying the drainage bag, and frequency of dressing changes (Köşgeroğlu & Ünver, 2009). Patients undergoing long-term wound treatment may experience psychosocial effects such as hopelessness and social isolation; the nurse manages this process with a supportive approach.

Table 2. Nursing-Focused VAC Follow-Up Criteria

Nursing Focus	***Control (Checklist) Questions***	***CHEKLİST***
Wound Assessment	Is there necrosis, infection, or exudate?	□ Yes □ No
Material Suitability	Is the foam type and size appropriate?	□ Yes □ No
Pressure Setting	Is it at an appropriate level for the patient?	□ Yes □ No
Pain management	Is there a need for pain assessment and analgesics during application and dressing changes?	□ Yes □ No
Infection monitoring	Redness, foul odour, fever, exudate colour and quantity?	□ Yes □ No
Patient education	Has the patient been informed about VAC device use and signs of complications?	□ Yes □ No
Device safety	Monitoring of vacuum level, tube kinking, and alarm status?	□ Yes □ No

Conclusions and Recommendations

Although VAC therapy is a multidisciplinary process, nursing care is central to this treatment. Wound monitoring, system setup, complication management, patient education, and emotional support are key components of nursing care. To ensure successful outcomes with VAC therapy, it is

important to incorporate application protocols into the nursing care process and adopt a systematic monitoring approach. Using daily care and monitoring forms is believed to be effective in shortening treatment duration, preventing complications, and boosting patient satisfaction. Additionally, ongoing training for nurses in this area and the development of clinical protocols will improve the success rate of VAC therapy.

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CHAPTER 9

NURSING DIAGNOSES AND NIC INTERVENTIONS ACCORDING TO NANDA AFTER RADICAL CYSTECTOMY AND ILEAL CONDUIT OPERATION IN A PATIENT DIAGNOSED WITH BLADDER TRIGONE MALIGNANT NEOPLASM: CASE REPORT

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Abstract

Introduction: Malignant neoplasms of the bladder trigone are rare tumors due to their proximity to the ureteral orifice and urethral entrance in the bladder anatomy, but they can be aggressive in terms of invasion and dissemination. Malignancies in this region may require advanced surgical interventions such as radical cystectomy and urinary diversion. Qualified nursing care plays a critical role in preventing complications and supporting the healing process after such major surgeries. The aim of this case report is to evaluate the effect of nursing care provided systematically as part of multidisciplinary treatment and care on patient outcomes in a patient who underwent radical cystectomy and ileal conduit.

Case Presentation: In this study, the postoperative nursing care process of a 73-year-old male patient diagnosed with bladder trigone malignant neoplasm was presented. The patient presented with macroscopic hematuria with clots and diagnostic evaluations revealed high-grade urothelial carcinoma. After neoadjuvant chemotherapy, the patient underwent radical cystectomy and urinary diversion with ileal conduit. In the postoperative period, the patient's vital signs and fluid balance were stable and clinical follow-up was performed closely.

Nursing Interventions: Nursing care was planned and implemented according to the North American Nursing Diagnosis Association (NANDA) classification and Nursing Interventions Classification (NIC). The outcomes of the interventions for the diagnoses were evaluated according to the Nursing Outcomes Classification (NOC) system. Infection control, protection of skin integrity, ostomy care, body image support and education-based care approaches were carried out in a holistic and multidisciplinary framework to minimize the risks of complications related to surgery.

Results: The patient did not develop any complications in the postoperative period. The patient, whose hemodynamic stability was ensured, learned stoma care and showed a positive attitude in coping with body image change. This shows the positive effect of integrated physical, psychological and educational aspects of nursing care on patient outcomes.

Conclusion: This case report emphasizes the importance of structured, evidence-based and multidisciplinary delivery of nursing care in improving postoperative outcomes in patients undergoing radical cystectomy and ileal conduit. The use of standardized nursing classification systems such as NANDA and NIC improves the quality of care and supports patient satisfaction. This study is one of the rare case examples that integrates

NANDA, NIC and NOC classifications to systematically address nursing care in a case with bladder trigone tumor and emphasizes its role in recovery.

Keywords: Bladder Cancer, Radical Cystectomy, Ileal Conduit, Nursing, NANDA

Özet

Giriş: Mesane trigonu malign neoplazmları, mesane anatomisinde üreter ağızları ve üretra girişine yakınlığı nedeniyle nadir görülmelerine rağmen invazyon ve yayılım açısından agresif seyir gösterebilen tümörlerdir. Bu bölgedeki malignitelerde, radikal sistektomi ve üriner diversiyon gibi ileri cerrahi girişimler gerekebilmektedir. Bu tür büyük cerrahiler sonrası komplikasyonların önlenmesinde ve iyileşme sürecinin desteklenmesinde nitelikli hemşirelik bakımı kritik rol oynamaktadır. Bu olgu makalesinin amacı, radikal sistektomi ve ileal konduit uygulanan hastada, multidisipliner tedavi ve bakımının bir parçası olarak sistematik bir şekilde verilen hemşirelik bakımının hasta sonuçlarına etkisinin değerlendirilmesidir.

Olgu Sunumu: Bu çalışmada, mesane trigonu malign neoplazmı tanısı almış, 73 yaşındaki erkek hastanın ameliyat sonrası hemşirelik bakım süreci sunuldu. Hasta, pıhtılı makroskopik hematüri şikâyeti ile başvurdu; yapılan tanısal değerlendirmeler sonucunda yüksek dereceli ürotelyal karsinom saptandı. Neoadjuvan kemoterapi sonrası, hastaya radikal sistektomi ve ileal konduit ile üriner diversiyon uygulandı. Ameliyat sonrası dönemde hastanın vital bulguları ve sıvı dengesi stabil seyretti, klinik izlemi yakından gerçekleştirildi.

Hemşirelik Girişimleri: Hemşirelik bakımı, Kuzey Amerikan Hemşirelik Tanıları Birliği (North American Nursing Diagnosis Association-NANDA) sınıflaması ve Hemşirelik Girişimleri Sınıflandırma Sistemi (Nursing Interventions Clasification-NIC) doğrultusunda planlandı ve uygulandı. Hemşirelik Sonuçları Sınıflaması (Nursing Outcomes Classification- NOC) sitemine göre de tanıya yönelik girişimlerin sonuçları değerlendirildi. Cerrahiye bağlı komplikasyon risklerini en aza indirmek amacıyla enfeksiyon kontrolü, cilt bütünlüğünün korunması, ostomi bakımı, beden imajı desteği ve eğitim temelli bakım yaklaşımları bütüncül ve multidisipliner bir çerçevede yürütüldü.

Bulgular: Ameliyat sonrası süreçte hastada herhangi bir komplikasyon gelişmedi. Hemodinamik stabilitesi sağlanan hasta, stoma bakımını öğrendi ve beden imajı değişikliğiyle baş etmede olumlu tutum sergiledi. Bu durum, hemşirelik bakımının fiziksel, psikolojik ve eğitsel boyutlarının

entegre biçimde uygulanmasının hasta sonuçları üzerindeki olumlu etkisini göstermektedir.

Sonuç: Bu olgu makalesi, radikal sistektomi ve ileal konduit uygulanan hastalarda, hemşirelik bakımının yapılandırılmış, kanıta dayalı ve multidisipliner biçimde sunulmasının ameliyat sonrası sonuçların iyileştirilmesindeki önemini vurgulamaktadır. NANDA ve NIC gibi standart hemşirelik sınıflama sistemlerinin kullanımı, bakımın kalitesini artırmakta ve hasta memnuniyetini desteklemektedir. Bu çalışma, NANDA, NIC ve NOC sınıflandırmalarını entegre ederek mesane trigonu tümörlü bir olguda hemşirelik bakımını sistematik biçimde ele alan ve iyileşmedeki rolünü vurgulayan nadir vaka örneklerinden biridir.

Anahtar kelimeler: Mesane Kanseri, Radikal Sistektomi, İleal Konduit, Hemşirelik, NANDA

Introduction

Bladder trigone malignant neoplasms are tumors that develop in the trigone, a triangular anatomical region at the base of the bladder that encompasses the entry points of both ureters and the exit of the urethra. Compared to neoplasms in other regions of the bladder, these tumors tend to exhibit a more aggressive course due to their anatomical localization and may invade surrounding tissues at an earlier stage (EAU, 2025; NCCN, 2024). Urothelial carcinoma, the most common histological type of these tumors, requires particular attention during surgical planning because of its proximity to the ureteral orifices and urethral opening (EAU, 2024). While treatment strategies vary depending on the tumor's stage, grade, and the patient's overall condition, transurethral resection (TUR) may be sufficient in the early stages, whereas radical cystectomy combined with adjuvant therapy is often necessary for advanced cases (EAU, 2025).

Radical cystectomy involves complete surgical excision of the bladder and is generally indicated for muscle-invasive tumors (Aminoltejari & Black, 2020). Following cystectomy, an ileal conduit—one of the most commonly employed urinary diversion techniques—is constructed by isolating a 15–20 cm segment of the terminal ileum and forming it into a tube. The ureters are anastomosed to this ileal segment, and its distal end is brought out through the anterior abdominal wall as a stoma. Urine continuously drains through this stoma and is collected in an external urostomy bag (Tanna, Powell, & Mambu, 2022).

After radical cystectomy and ileal conduit surgery, complications such as bleeding, anastomotic leakage, intra-abdominal infections, and intestinal injuries may occur as a result of the surgical procedure. In addition, urinary tract infections, surgical site infections, and stoma-related skin infections are among the most frequently reported postoperative complications (Kobayashi et al., 2021).

Stoma-related issues, including retraction, prolapse, necrosis, and peristomal skin irritation, as well as urological complications such as hydronephrosis, anastomotic stricture, and fistula formation, can also be observed. Moreover, metabolic acidosis and electrolyte imbalances may develop due to prolonged contact between urine and the ileal segment. Psychosocial challenges, such as altered body image, depression, and social isolation, are also common in these patients. Furthermore, the risk of deep vein thrombosis, pulmonary embolism, and delayed wound healing associated with prolonged immobilization should be taken into account (Prcic & Begic, 2017). A multidisciplinary team approach, regular nursing care, and patient and caregiver education are of great importance in mitigating these risks. The use of standardized terminology in nursing care facilitates universal standardization of practices. NANDA-I, one of the systems developed for this purpose, classifies nursing diagnoses into 13 domains, 47 classes, and 277 diagnoses for the period 2024–2026 (Birol, 2016; Herdman, Kamitsuru, & Lopes, 2024). The NIC system defines nursing interventions and organizes them into 7 domains, 30 classes, and 565 interventions with nearly 13,000 sub-activities (Erdemir, Kav, & Akman Yılmaz, 2017; The University of Iowa College of Nursing, 2025). These classifications support the systematic, traceable, and evidence-based delivery of nursing care.

Today, the increasing incidence of bladder cancer necessitates major surgical interventions such as radical cystectomy. Following these procedures, patients often experience physical, psychological, and social challenges. In particular, the use of an ileal conduit adds further complexity to nursing care, making it multidimensional. Therefore, planning nursing care in a systematic, structured manner and employing standardized terminology can enhance the quality and effectiveness of care. In this case report, the nursing care of a patient diagnosed with malignant neoplasm of the bladder trigone was organized using a holistic approach based on NANDA nursing diagnoses and NIC interventions.

Objective

The aim of this case report is to evaluate the nursing care process for a patient diagnosed with malignant neoplasm of the bladder trigone who underwent radical cystectomy and ileal conduit surgery. This evaluation was conducted using a holistic approach based on NANDA nursing diagnoses and the Nursing Interventions Classification (NIC) system. Additionally, the report aims to demonstrate the impact of multidisciplinary teamwork on patient outcomes.

Case Report

A 73-year-old man presented to the hospital with a one-month history of macroscopic hematuria with clots. His medical history was significant for diabetes mellitus, hypertension, and long-term smoking. Physical examination and laboratory tests were performed, and urinary tract ultrasonography (USG) revealed a polypoid lesion approximately 2.5 cm in diameter within the bladder. Subsequent cystoscopy showed residual tumor tissue, and transurethral resection (TUR-M) was performed under general anesthesia on July 22, 2024. Meatotomy was performed due to a narrow urethral meatus. A solid tumor measuring approximately 4–5 cm in diameter with a firm base at the level of the bladder neck was completely excised. Following resection, a 22 Fr three-way Foley catheter was inserted into the bladder, and continuous bladder irrigation was initiated. Histopathological examination revealed high-grade urothelial carcinoma with muscularis propria invasion and associated carcinoma in situ (CIS). Fluorodeoxyglucose positron emission tomography (FDG-PET) demonstrated no evidence of metastasis. The patient subsequently underwent a total of 4 cycles (8 sessions) of systemic neoadjuvant chemotherapy. Subsequently, radical cystectomy and urinary diversion with an ileal conduit were planned for February 5, 2025. Under general anesthesia, the abdominal cavity was accessed via a midline laparotomy. The visceral peritoneum overlying the bladder was carefully dissected. Both the right and left ureters were identified, dissected at the intramural level, and their distal ends were submitted for frozen section analysis. Fibrotic and adherent tissues were meticulously dissected, and the bladder was mobilized from the prostate and surrounding anatomical structures. The dorsal venous complex was ligated, and the bladder and prostate were excised en bloc. Frozen section analysis revealed no malignancy. Bilateral extended iliac lymphadenectomy was also performed during the procedure (Image 1). An 18 cm segment of ileum was isolated approximately 20 cm distal to the cecum, and an ileal

conduit was constructed. The intestinal continuity was restored through a primary anastomosis. The ureters were anastomosed to the conduit using 8 Fr catheters: the left ureter end-to-side to the distal end of the conduit, and the right ureter end-to-side to its lateral wall. The conduit was then brought out through the anterior abdominal wall to create a stoma. Hemostatic agents were placed in the surgical field, a drain was positioned appropriately, and the abdominal layers were closed in anatomical order. The procedure was concluded following standard counting and verification protocols.

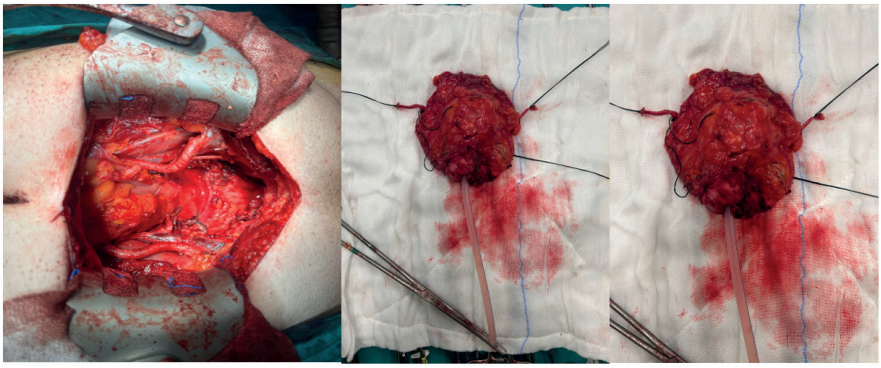

Image 1. Intraoperative Images of Radical Cystectomy and Ileal Conduit Creation

The patient was admitted to the intensive care unit (ICU) for postoperative monitoring. His general condition was stable; he was conscious, oriented, and breathing spontaneously. The Glasgow Coma Scale (GCS) score was 15. Hemodynamic parameters were within normal limits: arterial blood pressure 116/70 mmHg, heart rate 88 bpm, SpO_2 94%, and respiratory rate 20 breaths per minute. Piperacillin-tazobactam (Tazocin) 4.5 g three times daily (IV) was continued on postoperative day 2. The daily urine output was 1600 mL, and the surgical drain output was 150 mL. The fluid balance was monitored and recorded as +250 mL. Vital signs and fluid-electrolyte balance remained stable, and the patient was transferred to the urology ward at the end of postoperative day 1.

Ethical Aspects of the Case

Prior to the study, the patient and their family were informed about the study in accordance with the ethical principles outlined in the Declaration of Helsinki, and both written and verbal consent were obtained. To ensure confidentiality, the patient's real name was not disclosed; instead, the code

name "A.A.Ç." was used throughout the study. The principle of confidentiality was strictly upheld, and it was emphasized that all data obtained from A.A.Ç. would be used solely for scientific purposes and would not be shared with third parties or institutions under any circumstances.

Results

Nursing Diagnoses and NIC Interventions According to NANDA

Nursing Diagnosis 1: Risk of infection related to multiple factors, including invasive procedures such as radical cystectomy, ileal conduit creation, and the use of surgical drains and urinary catheters. This risk is further increased by disruption of the body's primary defense barriers due to the surgical incision, presence of a stoma, and catheter entry sites. Additional contributing factors include immunosuppression associated with advanced age (73 years), a history of neoadjuvant chemotherapy, and chronic conditions such as diabetes mellitus. Furthermore, the patient's stay in environments with heightened exposure to environmental pathogens, such as hospital wards and intensive care units, also contributes to this risk.

Domain 11: Safety/Protection, **Class 1:** Infection, **NANDA Code:** 00004 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- The patient remains free of signs and symptoms of infection, as evidenced by body temperature within normal limits (36.5–37.4 °C), absence of redness, warmth, edema, or purulent discharge at the surgical wound, stoma, and drain insertion sites. Laboratory findings include leukocyte counts within the normal range. Urine from the urostomy appears clear with no foul odor or turbidity.
- Demonstration of effective patient and caregiver behaviors to reduce and manage the risk of infection (Moorhead, Swanson, & Johnson, 2024; Wilkinson & Barcus, 2024).

Nursing Interventions

Domain 4: Safety, **Class 5:** Risk Management

NIC: Infection Control (Code: 6540), Infection Protection (Code: 6550)

- Strict adherence to hand hygiene (using antiseptic hand rub or washing with soap and water) before and after all invasive procedures.

- Use of personal protective equipment (PPE), such as gloves and gowns, when entering and leaving the patient's room as needed.
- Regular monitoring of laboratory parameters, including leukocyte count and C-reactive protein (CRP) levels.
- Administration of prescribed antibiotic therapy (piperacillin-tazobactam 4.5 g IV three times daily) at the correct dose, at appropriate times, and via the proper route, with ongoing evaluation of its effectiveness.
- Restriction of the number of visitors to minimize exposure to potential pathogens.
- Ensure that aseptic technique is maintained for all intravenous (IV) connections.
- Perform surgical wound care using appropriate methods and adhering strictly to aseptic techniques.
- Support adequate nutritional and fluid intake to promote immune function and healing.
- Provide education to the patient and caregiver on the signs and symptoms of infection, when to seek medical attention, and measures to prevent infection.
- Monitor vital signs, particularly body temperature, at regular intervals (at least every four hours) for early detection of infection.
- Assess the surgical incision, stoma, and drain insertion sites daily for local signs of infection such as redness, swelling, increased warmth, pain, and discharge, using aseptic technique.
- Verify that all drainage systems are closed and leak-proof, ensure tubing is not kinked, and confirm that the drainage bag remains below the level of the bladder at all times.
- Implement protective isolation measures when necessary to prevent the patient from exposure to other patients (e.g., single-patient room, visitor restrictions, warning signs).
- Provide detailed education to the patient and caregiver on signs of infection, including fever, chills, discharge, redness, and foul odor at the surgical site or stoma.
- Demonstrate and emphasize the importance of hand hygiene and clean technique during stoma and drain care through hands-on training.

- Teach the correct application of the stoma bag, methods to prevent leakage, and skin care techniques using practical demonstrations.
- Prior to discharge, instruct the patient and caregiver on home care procedures to prevent infection and use the teach-back method to confirm their understanding (Erdemir, Kav, & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: The patient did not exhibit any signs or symptoms of infection during the hospitalization period until discharge, and vital signs remained within normal limits. No evidence of infection such as redness, discharge, or edema was observed at the surgical site, stoma area, or drain insertion sites. Additionally, both the patient and caregiver were able to accurately recognize signs of infection and demonstrated effective implementation of hand hygiene and aseptic care principles. These outcomes were confirmed through verbal feedback and practical evaluations (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 2: Risk of bleeding related to major abdominal surgery (radical cystectomy and ileal conduit), extensive tissue dissection, vascular ligation, and postoperative anticoagulant therapy. Domain 11: Safety/Protection, **Class 2:** Physical Injury, **NANDA Code:** 00374 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- Hemodynamic parameters (blood pressure, pulse, and respiratory rate) remain stable, and surgical drain output is within the expected range in terms of amount and color.
- Minimal to no visible blood loss is observed.
- The patient and caregiver are able to recognize signs of bleeding such as dizziness, pallor, and sudden weakness and promptly report them to the healthcare team (Wilkinson & Barcus, 2024).

Nursing Interventions

Domain 2: Physiological: Complex, **Class N:** Tissue Perfusion Management
NIC: Bleeding Precautions (Code: 4010)

- Assess the surgical site and drainage areas regularly for signs of active bleeding (notify the physician immediately if drainage output exceeds 50–100 mL per hour).
- Monitor the patient for hematuria, occult blood in stool, and leakage around the stoma.

- Regularly evaluate orthostatic vital signs, including blood pressure, for indications of bleeding.
- Assess vital signs [BP: 116/70 mmHg, pulse: 88 bpm, SpO_2: 94%, respiratory rate: 20 breaths/min] every 4–6 hours.
- Monitor laboratory parameters such as hemoglobin, hematocrit, and coagulation profiles (e.g., INR/APTT) at regular intervals [PT-INR: 1.17, PT%: 75, APTT: 31.6 sec, PT: 15.7 sec].
- Administer anticoagulant therapy (enoxaparin sodium, Anti-Xa IU/0.4 mL) at the prescribed dose and schedule, and monitor adherence to the treatment protocol.
- Protect the patient from potential trauma that could lead to bleeding.
- Remind the patient to avoid lifting or carrying heavy objects.
- Administer medications (e.g., antacids) carefully, ensuring correct dosing and timing.
- Educate the patient and caregiver on recognizing signs of bleeding (e.g., dizziness, pallor, sudden weakness) and instruct them to report these symptoms promptly (Erdemir, Kav, & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: Bleeding control was effectively maintained during the postoperative period. No signs of active bleeding were observed at the surgical incision or drain sites. The drainage amount and color remained within the expected limits, and hemodynamic parameters were confirmed to be stable. Furthermore, both the patient and caregiver demonstrated adequate awareness in recognizing bleeding symptoms—such as sudden weakness, pallor, and hematuria and reporting them promptly to the healthcare team (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 3: Ineffective breathing pattern related to decreased lung expansion following general anesthesia, limited mobility, and risk of tracheobronchial secretion accumulation. Domain 4: Activity/Rest, **Class 4:** Cardiopulmonary Functions, **NANDA Code:** 00032 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- Respiratory rate remains within age- and condition-appropriate limits.
- Lung sounds are clear, with no evidence of rhonchi or rales.
- Respiratory effort is normal.

- Oxygen saturation (SpO_2) is maintained at 94% or higher.
- A deep and regular breathing pattern is achieved (Moorhead, Swanson, & Johnson, 2024; Wilkinson & Barcus, 2024).

Nursing Interventions

Domain 2: Physiological: Complex**, Class K:** Respiratory Management **NIC: Cough Enhancement (Code: 3250), Respiratory Monitoring (Code: 3350) Positioning (Code: 0840), Medication Administration (Code: 2300)**

- Position the patient in a seated posture with the head slightly flexed, shoulders relaxed, and knees slightly bent.
- Encourage the patient to take several deep breaths.
- Instruct the patient to inhale deeply, hold their breath for two seconds, and then cough forcefully two to three times in succession.
- Teach the patient to lean slightly forward and perform 3–4 deep inhalations through the nose with the glottis open.
- Advise the patient to take several deep breaths slowly, exhale gently, and then cough after exhalation.
- Teach the patient the coughing technique following maximum inhalation.
- Demonstrate deep breathing and effective coughing techniques to enhance lung expansion and facilitate secretion clearance.
- Instruct the patient on the use of an incentive spirometer and encourage performing the exercise at least 10–12 times per day.
- Support adequate systemic fluid intake as appropriate.
- Advise the patient to use a pillow or rolled blanket to support the surgical incision site while coughing.
- Regularly monitor respiratory rate, rhythm, depth, and effort.
- Document chest movements, symmetry, use of accessory respiratory muscles, and the presence of retractions in the subclavicular and intercostal areas.
- Evaluate oxygen saturation and respiratory rate before and after breathing exercises.

- Monitor for abnormal respiratory patterns such as snoring, bradypnea, tachypnea, hyperventilation, Kussmaul respiration, Cheyne-Stokes respiration, apnea, Biot's respiration, and ataxic breathing.
- Auscultate lung sounds and document areas of diminished or absent breath sounds as well as any adventitious sounds.
- Assess for wheezing and crackles in the major airways and determine the need for suctioning if necessary.
- Reassess lung sounds via auscultation after treatment and document the findings.
- Observe for signs of excessive restlessness, anxiety, and air hunger.
- Regularly monitor the patient's ability to cough effectively.
- Monitor the amount, consistency, and color of respiratory secretions.
- Evaluate chest X-ray results at regular intervals.
- Administer respiratory therapies such as nebulization when indicated.
- Elevate the head of the bed to 45–60 degrees (semi-Fowler position) to promote pulmonary expansion and ease breathing.
- Administer mucolytic medications (e.g., acetylcysteine, MUCİNAC 300 mg ampoule via intravenous or inhalation routes) as prescribed by the physician.
- Educate the patient and family about the expected and potential side effects of medications.
- Closely monitor the therapeutic effects and any adverse reactions of administered medications (Erdemir, Kav, & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: As a result of the nursing interventions implemented, the targeted improvement in the patient's respiratory function was achieved. The patient was observed to perform breathing exercises using the correct techniques as taught. Oxygen saturation levels were maintained within the desired range (≥94%), and lung auscultation revealed no pathological adventitious sounds such as rhonchi or rales. These positive clinical findings were accompanied by a reduction in respiratory effort and normalization of the patient's breathing pattern (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 4: Acute pain related to tissue damage resulting from radical cystectomy and ileal conduit

surgery, presence of surgical incision, and surgical drains. Domain 12: Comfort, **Class 1:** Physical Comfort, **NANDA Code:** 00132 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- Reduction in verbal and nonverbal expressions of pain.
- Relaxation observed in behavioral indicators such as facial expressions, body posture, and tone of voice.
- Development of skills for coping with pain without pharmacological interventions.
- Positive response to both pharmacological and non-pharmacological interventions.
- Participation in breathing exercises, mobilization, and personal care activities with minimal or tolerable pain.
- The patient acquires knowledge regarding pain control (Moorhead, Swanson, & Johnson, 2024; Wilkinson & Barcus, 2024).

Nursing Interventions

Domain 1: Physiological: Basic, **Class E:** Physical Comfort Promotion **NIC: Pain Management (Code: 1400)**

- Conduct a comprehensive assessment of pain characteristics, including location, intensity, onset, duration, frequency, quality, severity, and aggravating factors.
- Regularly observe the patient for verbal and nonverbal indicators of pain.
- Administer analgesic therapy as prescribed by the physician.
- Consider the patient's level of knowledge and beliefs about pain when planning care.
- Identify and document the impact of pain on the patient's quality of life.
- Analyze with the patient the factors that exacerbate or alleviate pain.
- Provide the patient with detailed information about the causes and duration of pain, as well as the potential discomfort associated with procedures.
- Monitor and control environmental factors (e.g., room temperature, lighting, noise) that may influence the patient's response to discomfort.

- Reduce or eliminate factors that may exacerbate or affect the pain experience, such as fear, fatigue, monotony, and lack of information.
- Select and implement appropriate strategies (pharmacological, non-pharmacological, and interpersonal) to facilitate pain relief or reduction.
- Ensure optimal pain relief through the correct administration of prescribed analgesics.
- Apply non-pharmacological methods such as deep breathing, relaxation exercises, distraction techniques, and music therapy.
- Position the patient appropriately and plan mobilization carefully to avoid positions that may cause pain in the surgical area.
- Administer analgesia and/or non-pharmacological strategies prior to painful procedures.
- Continuously assess the patient's pain experience and monitor the effectiveness of implemented pain management interventions.
- Ensure adequate rest and sleep to support pain relief and reduction.
- Adopt a multidisciplinary approach to pain management.
- Encourage family members to participate in and support pain reduction strategies.
- Evaluate the patient's satisfaction with pain management at regular intervals.
- Encourage the patient to monitor their own pain and take appropriate actions as needed.
- Provide detailed education to the patient on pain coping strategies and the importance of effective pain control (Erdemir, Kav, & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: The patient's pain management goals were achieved, as evidenced by both behavioral and functional indicators. No pain-related discomfort was observed in the patient's facial expressions or behaviors, and the patient was able to verbalize both the presence of pain and the subsequent sense of relief. From a functional perspective, the patient actively participated in mobilization, breathing exercises, and other daily care activities with tolerable levels of pain (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 5: Risk for falls related to advanced age, risk of altered consciousness following general anesthesia, postoperative fatigue, and limited mobility.

Domain 11: Safety/Protection, **Class 2:** Physical Injury, **NANDA Code:** 00303 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- The patient uses support during mobilization, identifies and reports environmental factors that may contribute to falls, and accepts and applies fall prevention strategies (Moorhead, Swanson, & Johnson, 2024; Wilkinson & Barcus, 2024).

Nursing Interventions

Domain 4: Safety, **Class V:** Risk Management

NIC: Fall Prevention (Code: 6490)

- The patient's room is regularly inspected for objects that may pose a fall risk. (This includes securing furniture, checking for floor slipperiness, ensuring bed rails are raised, adjusting the bed height for patient safety, and placing frequently used items such as the call bell, water, and glasses within easy reach.)
- Initial mobilization is performed under nurse supervision, and the patient is assessed for orthostatic hypotension.
- The patient's gait, balance, and fatigue level are monitored during movement.
- The patient's perception of their own balance is assessed.
- Personal items are positioned within easy reach of the patient.
- The patient is informed about seeking assistance when needed during movement.
- Monitor the patient's mobility during transfers from bed to chair and chair to bed.
- Remove small furniture items (e.g., footstools) from the environment to prevent tripping or collisions during movement.
- Clear floor clutter and eliminate any slipping hazards.
- Ensure adequate lighting to facilitate visibility.
- Verify that the patient wears properly fitted, securely fastened, and non-slip footwear.

- Educate family members about conditions that may cause falls and preventive measures to reduce fall risk.
- Collaborate with other healthcare team members to minimize medication side effects that may increase fall risk.
- Conduct regular fall risk assessments.
- Provide low-level night lighting to enhance safety during nighttime.
- Place a fall risk warning sign on the patient's room door; inform all staff members and adjust the care plan accordingly (Erdemir, Kav, & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: Fall risk management was successfully implemented during the postoperative period, and no fall incidents were reported. The patient was observed to perform mobilization safely with appropriate support. During personal care activities, the patient maintained a safe environment by recognizing and addressing environmental factors. As a result of the education provided, both the patient and caregiver demonstrated sufficient knowledge regarding fall risks and prevention strategies. In preparation for discharge, they were assessed as having adopted and being willing to implement fall prevention measures in the home environment (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 6: Risk of impaired skin integrity due to surgical procedure and age

Domain 11. Safety / Protection **Class 2.** Physical injury **NANDA Code**: 00047 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- No redness, edema, erosion or ulceration of the skin.
- The skin is moist, healthy and its integrity is preserved
- Regular and correct use of skin barrier products (Moorhead, Swanson, & Johnson, 2024; Wilkinson, & Barcus, 2024).

Nursing Interventions

Domain 2. Physiologic: Complex **Class L**. Skin/Wound Management

NIC: Skin care: Local Treatments (Code: 3584) Skin Surveillance (Code: 3590) Incision Site Care (Code: 3440)

- The patient is dressed in comfortable and appropriate clothing that does not restrict movement.

- Skin and mucous membranes are regularly monitored for redness, excessive warmth, edema or discharge.
- The extremities are assessed for color, temperature, swelling, pulse, tissue integrity, edema and ulcer formation.
- The condition of the surgical incision is observed as appropriate.
- The skin is checked for excessive dryness or dampness.
- Sources of pressure and friction are identified and necessary precautions are taken.
- Family members/caregivers are informed about early signs of compromised skin integrity.
- The incision site is monitored for signs of redness, edema, dehiscence, dehydration and evisceration.
- The healing process at the incision site is regularly assessed.
- The incision site is cleaned under hygienic conditions with appropriate cleaning solutions.
- The incision site is carefully monitored for signs and symptoms of infection.
- Dressing changes are performed at appropriate intervals and in accordance with aseptic techniques.
- The patient is taught in detail how to care for the incision during bathing (Erdemir, Kav & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: In the postoperative period of the patient, it was determined that nursing care goals for skin integrity were achieved. It was observed that the integrity of the skin was preserved and expected complications such as redness, edema or irritation did not develop (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 7: Impaired tissue integrity due to the presence of a stoma

Domain 11. Safety / Protection **Class 2**. Physical Injury **NANDA Code:** 00044 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- No redness, edema, erosion or ulceration of the skin around the stoma.

- The skin around the stoma is moist, healthy and its integrity is preserved.
- Regular and correct use of skin barrier products (Moorhead, Swanson, & Johnson, 2024; Wilkinson, & Barcus, 2024).

Nursing Interventions

Domain 2. Physiologic: Basic **Class B.** Elimination Management

NIC: Stoma Care (Code: 0480)

- The patient and caregiver are thoroughly trained in the use and care of stoma materials.
- The skin around the stoma is regularly assessed for signs of irritation, edema, necrosis or infection.
- Care is taken to ensure that the stoma tools used fit snugly to the skin surface.
- Hands-on training is provided to the patient and/or caregiver on proper bag insertion, prevention of leaks, cutting to the appropriate size and frequency of replacement. It is taught that the bag should be emptied when it is 1/3 to 1/2 full (usually 4-6 times a day) and this process is followed regularly.
- The skin around the stoma is gently cleaned with warm water; irritating soaps, excessive friction and trauma are avoided.
- Skin integrity is maintained by applying skin barrier cream before and after bag change.
- Bag changes are done in case of leakage or odor or routinely every 2-3 days.
- The patient and caregiver are encouraged to express their feelings and thoughts about changes in body image.
- The patient is guided in planning daily care routines.
- The patient is informed about how to monitor for possible complications and symptoms that should be recognized early.
- After discharge, the patient is encouraged to participate in social support groups that support life with stoma (Erdemir, Kav & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: In the postoperative period of the patient, it was determined that the nursing care goals for skin integrity around the

stoma were achieved. It was observed that the integrity of the skin around the stoma was preserved and expected complications such as redness, edema or irritation did not develop. In addition, it was confirmed that the patient and caregiver gained the necessary knowledge and skills to accurately assess the skin around the stoma during ostomy bag change (Moorhead, Swanson, & Johnson, 2024).

Nursing Diagnosis 8: Impaired body image due to the change in body image due to stoma and the necessity of carrying a bag

Domain 6. Self Perception **Class 3.** Body Image **NANDA Code:** 00497 (Herdman, Kamitsuru, & Lopes, 2024).

Targeted NOC Outcomes:

- Expressing negative thoughts about their body
- Recognizing and accepting the changes that occur in your body
- Developing skills to cope with new physical conditions
- Coping with emotions such as shame and embarrassment related to body perception
- Sharing emotional reactions
- Making sense of the new life situation
- Avoiding social isolation
- Showing willingness to receive support (Moorhead, Swanson, & Johnson, 2024; Wilkinson, & Barcus, 2024).

Nursing Interventions

Domain 3. Behavioral **Class R.** Coping Assistance

NIC: Strengthening body image (Code: 5220)

- Hastayla açık, empatik ve yargılayıcı olmayan bir iletişim kurularak duygularını ifade etmelerine olanak sağlanır.
- Ameliyatın neden olduğu değişiklikleri tartışmalarına destek olmak için hastayla bilgilendirici ve güçlendirici görüşmeler yapılır; stoma ile yaşama konusunda danışmanlık sunulur ve torba kullanımıyla başa çıkma becerilerini geliştirmek için eğitim verilir.
- Hasta, bedenini kabul etmesi ve beden imajının olumlu yönlerini tanıması için teşvik edilir.

- Tüm hemşirelik girişimleri mahremiyet ilkesine dikkat edilerek planlanır ve uygulanır (Erdemir, Kav & Akman Yılmaz, 2017; Wilkinson & Barcus, 2024).

Achieved NOC Outcomes: The patient expressed her negative thoughts about her body image. She shared her feelings about the care process and appearance of her stoma and expressed her concerns about it. After the applied education and counseling, she increased her level of knowledge about living with stoma and improved her coping skills. She did not have difficulty in expressing herself in social life and showed a more self-confident attitude in maintaining social interactions. She also showed an open approach to receiving psychological support and felt that her privacy was respected during the care provided (Moorhead, Swanson, & Johnson, 2024).

Conclusıon and Recommendatıons

This case report demonstrated the effectiveness of holistic nursing care planned in line with NANDA nursing diagnoses and NIC interventions in a patient who underwent radical cystectomy and ileal conduit operation with a diagnosis of bladder trigone malignant neoplasm. As a result of the structured nursing care processes applied, the patient did not develop possible complications such as infection, bleeding, respiratory complications and disruption of skin integrity in the postoperative period. In addition, the patient gained sufficient knowledge and skills in stoma care, showed a positive attitude towards coping with changes in body image, and actively participated in activities of daily living. These findings support that the integration of evidence-based nursing care with a multidisciplinary team approach improves patient outcomes.

Recommendations for future studies are as follows:

- Prospective studies on the use of NANDA, NIC and NOC classifications in larger groups of patients undergoing similar surgical procedures should be conducted to support the effectiveness of care with stronger evidence.
- Nursing-based psychosocial support programs should be developed to prevent body image impairment and improve quality of life in patients with ostomy.
- Standardized protocols for the training of nurses for early diagnosis and management of postoperative complications should be established and disseminated.

- Comprehensive home care guidelines and follow-up programs for patients and caregivers should be prepared to strengthen post-discharge care processes.

In conclusion, a systematic nursing approach based on NANDA, NIC and NOC classifications plays an important role in preventing complications, accelerating the healing process and increasing patient satisfaction in patients undergoing major urologic surgery.

Conflict of Interest

There is no conflict of interest between the authors.

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CHAPTER 10

THE EFFECTIVENESS OF EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT) IN THE TREATMENT OF DIABETIC FOOT ULCERS

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Hande CENGİZ AÇIL[2]

Abstract

Diabetic foot ulcers are a significant health concern that severely impairs patients' quality of life, often accompanied by complications such as infection, tissue loss, and delayed wound healing, and may ultimately result in amputation if left untreated. Peripheral neuropathy and peripheral arterial disease, which frequently develop due to prolonged hyperglycemia, are major contributors to the formation of these ulcers. Sensory loss caused by neuropathy can prevent patients from noticing minor traumas to their feet, while impaired peripheral circulation hinders the healing of such injuries. When these factors coexist, ulceration at pressure points on the skin becomes almost inevitable. In addition to fundamental approaches such as infection control, debridement, pressure offloading, and glycemic regulation, complementary and innovative treatment methods have gained attention in recent years. Among these, Extracorporeal Shock Wave Therapy (ESWT) has attracted

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considerable interest due to its non-invasive nature, ease of application, and promising clinical outcomes. ESWT promotes angiogenesis by delivering high-energy acoustic waves to the wound area, thereby enhancing neovascularization and improving microcirculation. This process increases the delivery of oxygen and nutrients to the tissue and supports the formation of granulation tissue. Furthermore, ESWT stimulates regenerative processes at the cellular level by increasing the release of growth factors. In this chapter, the impact of Extracorporeal Shock Wave Therapy (ESWT) on the wound healing process of diabetic foot ulcers is analyzed based on recent evidence from the literature.

Keywords: Diabetes, Foot Ulcers, Wound Healing, Extracorporeal Shockwave Therapy

1.Introduction

Diabetes is a chronic metabolic disease that develops as a result of the pancreas failing to produce sufficient insulin or the body's inability to effectively use the insulin it produces (WHO,2025). The 2025 data from the International Diabetes Federation (IDF) clearly demonstrate the global prevalence of this condition. According to these data, approximately 11.1% of the adult population aged 20 to 79 years (equivalent to 1 in every 9 individuals) is living with diabetes (IDF,2025). This high prevalence of diabetes is associated with a range of serious complications. In particular, prolonged hyperglycemia can lead to peripheral neuropathy and peripheral arterial disease, which are major contributing factors in the development of diabetic foot ulcers (Rathur and Boulton, 2007).

2.Pathophysiology of Diabetic Foot Ulcers

Foot ulcers that develop in diabetic individuals are generally classified as lesions with neuropathic, ischemic, or neuro-ischemic etiology. Neuropathic ulcers are the most common type of ulcer that develops in feet with sensory loss due to repeated pressure or trauma. In people with diabetic neuropathy in particular, wearing inappropriate footwear, walking barefoot, or even a minor injury can lead to permanent wounds. Reduced sensation, foot deformities, and joint stiffness lead to abnormal pressure distribution in the foot. This often results in callus formation, which further increases localized pressure, leading to subcutaneous hemorrhage and, eventually, ulceration (Cavanagh et. al.,2005; Jeffcoate and Harding, 2003) Diabetic peripheral artery disease primarily affects the distal extremity arteries between the knee and ankle. Mechanical trauma causes tissue damage in areas with already reduced

perfusion and impaired tissue integrity, significantly increasing the risk of ischemic ulceration. This leads to critical tissue hypoxia, disrupting the wound healing process and paving the way for chronic ulcer formation (Bates, and AbuRahma, 2004; Demir et al., 2007). Diabetic foot ulcers significantly impair patients' quality of life due to infection, tissue necrosis, and wounds that are resistant to treatment. Furthermore, they substantially increase the risk of lower limb amputation (Alavi et al., 2014). These challenges highlight the vital importance of early diagnosis, effective prevention strategies, and multidisciplinary approaches in the management of diabetic foot ulcers (Wang et al., 2014).

3.Classification of Diabetic Foot Ulcers

Given the multifactorial nature of diabetic foot ulcer (DFU) development and healing, clinically recognized and standardized classification systems are essential for accurate diagnosis, treatment planning, and outcome evaluation (Monteiro-Soares et al., 2020). Although numerous diabetic foot ulcer classification systems have been proposed in the literature, none has achieved universal acceptance (Cavanagh et. al.,2005). Most systems classify lesions based on wound size, depth, ischemia, and infection, while risk factors such as neuropathy and peripheral arterial disease are included when clinically relevant (Wang et al., 2022). Meggitt-Wagner system is a six-grade classification model primarily focused on ulcer depth and the extent of tissue necrosis. Although it is intuitive and easy to use due to its wound-based approach, it does not account for key clinical parameters such as peripheral neuropathy and peripheral arterial disease (PAD), limiting its ability to distinguish between infected and ischemic lesions (Wagner, 1981; Wang et al., 2022) The University of Texas classification systematically classifies diabetic foot ulcers using a 4×4 matrix that evaluates ulcer depth, infection, and ischemia (Oyibo et al., 2001)

The SAD classification includes five basic components, each scored from 0 to 3, to determine the severity of the ulcer: wound size (area and depth), infection (sepsis), ischemia (arteriopathy), and neuropathy (denervation) (Treece et al., 2004). The PEDIS classification system provides a systematic approach to the assessment of foot ulcers based on clinical parameters such as perfusion status, ulcer size, depth, and associated tissue loss, presence of infection, and sensory loss (Schaper, 2004). These classification systems guide the clinical decision-making process in determining the healing potential of ulcers and selecting appropriate treatment methods. These systems also contribute to the early identification of patients in high-risk

groups and the planning of preventive foot care interventions (Turgut and İlçe, 2024).

4.Prevention and Treatment of Diabetic Foot Ulcers

The most effective method for preventing diabetic lower extremity complications is maintaining optimal glycemic control. Current clinical evidence demonstrates that tight glycemic regulation significantly reduces complications associated with diabetes, such as neuropathy, vascular damage, and wound development (Markakis et al.,2016; Wang, 2022). Preventive measures include periodic neuropathy screening, educating patients on daily foot examinations, and selecting appropriate footwear (Reardon et al., 2020). Patients are advised to check their feet every day, wash them with warm water and dry them thoroughly, have calluses treated at a healthcare facility without attempting to treat them at home, cut their nails straight across without cutting them too deeply, avoid walking barefoot, pay attention to choosing appropriate shoes and socks, check the inside of their shoes before wearing them, and avoid direct contact with hot surfaces to warm their feet (Demir et al., 2007). Various treatment modalities for diabetic foot ulcers include debridement, hyperbaric oxygen therapy, hydrotherapy, negative pressure wound therapy, revascularization procedures, as well as application of dermal collagen and growth factors (Markakis et al.,2016; Rathur and Boulton, 2007; Wang et al., 2014). In addition, bacterial toxins in diabetic foot ulcers can lead to infection, resulting in collagen degradation, stress, and malnutrition; these factors hinder wound healing and contribute to poor prognosis and an increased risk of amputation. The correct identification and appropriate control of infections are critical for the patient's prognosis. However, inappropriate or unnecessary antibiotic use can lead to adverse outcomes such as antibiotic resistance (Abbas et al., 2015). The Infectious Diseases Society of America (IDSA) recommends selecting narrow-spectrum agents, discontinuing treatment once symptoms have resolved, and avoiding unnecessary antibiotic use to mitigate the risk of antibiotic resistance (Lipsky et al., 2012). Debridement is the process of removing necrotic (dead) tissue, foreign bodies, or infected material from the wound site that impedes wound healing. Extensive excision of the ulcerated area and surrounding tissues has the potential to transform the chronic wound environment into acute wound biology, thereby positively influencing the healing process (Cardinal, 2009). Hyperbaric oxygen therapy increases oxygen levels in hypoxic tissues by enabling the inhalation of 100% oxygen in a pressurized environment. This therapy supports infection control by enhancing leukocyte function, promotes granulation tissue formation by increasing fibroblast activity and collagen

synthesis, and improves microcirculation through enhanced angiogenesis (Kalani et al., 2002). Hydrotherapy or aquatic exercise is a water-based method used to improve the patient's health status. It facilitates the softening of necrotic tissue, enhances microcirculation, and contributes to infection control (Shourabi et al., 2020).

Negative pressure wound therapy, also known as vacuum-assisted closure, converts an open wound into a controlled closed wound using a subatmospheric pressure dressing. This method supports the healing process by removing wound exudates, reducing edema, accelerating granulation tissue formation, and reducing bacterial load (Hess et al., 2003). Revascularization procedures are surgical or endovascular (balloon angioplasty, stenting) interventions performed in individuals with diabetes-related peripheral artery disease to restore blood flow to ischemic tissues. These methods aim to support wound healing by increasing tissue perfusion (Kota et al., 2013). In dermal collagen treatments, collagen components such as fibroblasts and keratinocytes form the basis of wound healing and skin formation processes. Collagen-based wound dressings act as a biological scaffold that supports the remodeling of the extracellular matrix, promoting tissue repair and regenerative processes (Holmes et al., 2013). In the treatment of growth factors, the topical use of endogenous healing factors such as Platelet Derived Growth Factor (PDGF) accelerates wound healing by increasing cell proliferation, angiogenesis, and collagen synthesis (Barrientos et al., 2008). In addition to these methods, extracorporeal shock wave therapy (ESWT) has recently emerged as an effective method for treating diabetic foot ulcers (Vangaveti et al., 2023).

5.Extracorporeal Shock Wave Therapy (ESWT)

Extracorporeal shock wave therapy (ESWT) is a medical method that involves sending high-energy waves to a specific area of the body. This therapy was first developed to break up kidney stones and was used as a procedure known as extracorporeal shock wave lithotripsy (ESWL) (Zhang and Ma, 2023). ESWT is a non-invasive and effective treatment method that enhances blood circulation and accelerates healing. Studies have demonstrated that the high-energy shock waves used in this therapy stimulate angiogenesis in the wound area, thereby improving microcirculation within the ulcerated tissue. Additionally, ESWT is known to activate the body's natural healing mechanisms. The mechanical waves applied during treatment promote the release of growth factors, supporting the repair of damaged tissues (Huang et al., 2016; Saggini et al., 2008; Vangaveti et al., 2023; . Wang et al., 2015). In addition, shock wave therapy causes certain biological responses in the

body. These responses include the accumulation of mesenchymal stem cells that repair damaged tissue, as well as the stimulation of cell proliferation and differentiation into different cell types. It also has anti-inflammatory and antimicrobial effects. In addition, it helps reduce pain by suppressing pain perception. All these effects are considered important biological responses that explain why shock wave therapy is effective in wound healing (Mittermayr et al., 2012). In a study conducted with 38 patients with chronic diabetic foot ulcers, the patients were randomly divided into two groups: the ESWT group and the control group. The ESWT group received a total of 8 treatment sessions, twice a week for 3 weeks. At the end of treatment, the ESWT group showed a reduction in wound surface area, an increase in healing rate, and a significant reduction in average healing time ($p < 0.05$) (Omar et al., 2014). In a pilot study conducted by Yang et al. (2019), a total of 6 sessions of ESWT were administered twice a week for 3 weeks to 10 patients with diabetic foot ulcers, and a 19.6% increase in tissue oxygen pressure ($p < 0.05$) and a significant improvement in skin blood flow were observed in the treated feet after treatment (Yang et al., 2019). Similarly, in a study conducted by Fan et al. (2022), 87 patients with diabetic foot ulcers were evaluated. Forty-six patients in the intervention group received ESWT in addition to standard nursing care, while 41 patients in the control group received routine treatment alone. The ESWT group demonstrated significantly shorter wound healing times, lower infection rates, and improved quality of life compared to the control group. These positive outcomes were statistically significant ($p < 0.05$) (Fan et al., 2022).

Jeong et al. (2023) applied ESWT three times per week for three weeks to 25 patients with Wagner stage I–II diabetic foot ulcers. A significant increase in microcirculation was observed starting from the second week. These findings suggest that ESWT, when administered for at least two weeks, may enhance tissue perfusion and support the healing process (Jeong et al., 2023). In a study comparing the efficacy of extracorporeal shock wave therapy (ESWT) and hyperbaric oxygen therapy (HBO) in chronic diabetic foot ulcers, 72 patients with chronic diabetic foot ulcers were divided into two groups and treated with ESWT and HBO, respectively. Patients in the ESWT group received shock wave therapy every two weeks for six weeks, while patients in the HBO group received daily hyperbaric oxygen therapy for 20 days. Following treatment, patients who underwent ESWT showed higher rates of clinical improvement in wound healing, increased local blood flow, and a significant increase in cellular activity. Additionally, immunohistochemical analyses revealed a significant increase in factors supporting vascular formation in the ESWT group. These results suggest that

ESWT may be more effective than HBO therapy in improving diabetic foot ulcers (Wang et al., 2009). On the other hand, in a randomized controlled study conducted by Vangaveti et al. (2023), 48 patients were evaluated, and although a reduction in wound size was observed after 6 weeks of ESWT application, this difference was not found to be statistically significant ($p > 0.05$) (Vangaveti et al., 2023).

6.Conclusion

Studies in the literature indicate that Extracorporeal Shock Wave Therapy (ESWT) supports the formation of granulation tissue by enhancing angiogenesis and improving microcirculation in the treatment of diabetic foot ulcers, thereby significantly accelerating the wound healing process. Additionally, ESWT has been reported to offer a safe alternative to standard treatments due to its non-invasive nature, ease of application, and low adverse effect profile. However, a considerable portion of existing studies involve small sample sizes and exhibit variability in treatment protocols. Therefore, to establish the definitive role of ESWT in the management of diabetic foot ulcers, there is a need for multicenter, large-scale, long-term randomized controlled trials conducted with standardized treatment protocols and robust scientific evidence.

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CHAPTER 11

RISK FACTORS AND MANAGEMENT OF EARLY POSTOPERATIVE DELIRIUM IN GERIATRIC PATIENTS

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ABSTRACT

Delirium is an acute neurocognitive disorder marked by abrupt fluctuations in level of consciousness and attention. According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), it is diagnosed when there is a rapidly developing and fluctuating disturbance in awareness, thinking, and attention that cannot be explained by another neurocognitive disorder or substance effect. Postoperative delirium refers to delirium symptoms that emerge following a surgical intervention, typically within the first five days. In geriatric patients, postoperative delirium is one of the most common and serious complications; however, it is frequently overlooked because care staff often lack adequate training to recognize its symptoms, environmental factors in the hospital can mask those symptoms, signs may be mistaken for dementia or the normal aging process, and delirium-specific screening protocols are often insufficient. This oversight is associated with increased morbidity and mortality. The aim of this review

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is to examine, in light of the latest literature and guidelines, the causes and management of early postoperative delirium in geriatric patients. The aim of this review is to examine, in light of the latest literature and guidelines, the causes and management of early postoperative delirium in geriatric patients.

The etiology of delirium in older adults is multifactorial and is often conceptualized by the "frailty threshold" model. According to this framework, an individual with numerous or strong predisposing factors may develop delirium in response to even a mild precipitant; conversely, a severe precipitant can trigger delirium in a patient with few predisposing factors.

The onset of postoperative delirium results from the interaction between patient-specific vulnerability factors and perioperative stressors. Vulnerability factors, which reduce a patient's capacity to tolerate surgical stress, include advanced age (>75 years), preexisting cognitive impairments or psychiatric disorders, dependence in activities of daily living, a high ASA physical status (III–IV) reflecting multiple comorbidities, chronic use of sedative or psychoactive medications, and emergency surgery. Precipitating factors, acute insults that directly provoke delirium, include major intraoperative blood loss (>1,000 mL), benzodiazepine premedication or intraoperative use, ketamine administration, low serum albumin, fluid–electrolyte imbalances, inadequate pain control, disruption of the sleep–wake cycle, indwelling urinary catheters, and physical restraints.

In patients at risk, early detection and implementation of preventive interventions are critical. Both the American Geriatrics Society (2021) and National Institute for Health and Care Excellence (2023) guidelines recommend early identification of high-risk patients, systematic screening, and deployment of preventive strategies. Once delirium has developed, the initial step is to identify and correct any underlying causes. Pharmacological treatments are known neither to reduce the severity of delirium nor to address its root causes or mortality. However, in patients unresponsive to nonpharmacological measures, low-dose antipsychotics (haloperidol or risperidone) may be considered, particularly in hyperactive patients who pose a risk to themselves or to healthcare personnel. Given the increased toxicity and adverse-effect profile in the elderly, close cognitive and cardiac monitoring is mandatory when such agents are used.

The cornerstone of postoperative delirium management is a hierarchy of interventions: prioritize nonpharmacological methods, optimize the environment, and provide cognitive and sensory support, using pharmacological interventions only when clearly indicated. These approaches

facilitate efficient management of delirium and contribute to improved long-term cognitive and functional outcomes.

Keywords: geriatric patient; postoperative delirium; delirium management

Delirium is an acute neurocognitive disorder characterized by sudden alterations in consciousness and attention (Karadaş & Özdemir, 2019; APA, 2013). With the global increase in life expectancy and population aging, the demand for major surgical procedures among older adults has significantly risen. Consequently, the burden of postoperative delirium on healthcare systems has increased, and its clinical significance is being increasingly recognized. In particular, the incidence of postoperative delirium is reported to be higher in individuals aged 65 and older (Igwe et al., 2023).

Postoperative delirium is a clinical condition that emerges following anesthesia and surgery, characterized by an acute onset, fluctuating course, and typically reversible disturbances in consciousness and attention (Karadaş & Özdemir, 2019; APA, 2013). According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), the diagnosis of delirium requires the presence of a rapidly developing and fluctuating disturbance in awareness, cognition, and attention that cannot be explained by another neurocognitive disorder or the effects of a substance (APA, 2013). Postoperative delirium may occur as early as ten minutes after anesthesia or at any point until hospital discharge. It most commonly peaks within the first one to three days after surgery (Janjua et al., 2023). Frequently observed in older adults following surgery, this condition can lead to severe complications and, in some cases, become life-threatening. Therefore, postoperative delirium is considered one of the most common postoperative complications in geriatric patients. Studies have reported that the risk of postoperative delirium in elderly individuals varies widely, ranging from 10% to 47%, depending on the type and complexity of the surgical procedure (Igwe et al., 2023; Hermosa & Cruz, 2024).

Despite its prevalence and severity, delirium is frequently underrecognized in geriatric surgical patients due to several factors: its symptoms may be confused with dementia or normal aging, inadequate screening, lack of education and awareness among healthcare staff, and environmental factors that obscure clinical signs (Lindroth et al., 2024). In this context, healthcare professionals' ability to recognize, prevent, and effectively manage postoperative delirium is critically important for ensuring patient safety and improving recovery outcomes.

Postoperative delirium is associated with various adverse health outcomes. These include severe complications, prolonged hospital stays, loss of independence in daily living, cognitive decline, delayed recovery, rehabilitation setbacks, and even increased mortality (Yan et al., 2023; Jin et al., 2020).

Etiology and Risk Factors

The etiology of delirium in older adults is multifactorial and is often explained by the "threshold model of vulnerability." According to this model, individuals with multiple or significant predisposing factors may develop delirium with a single or mild precipitating factor, whereas those with few predisposing factors may still develop delirium when exposed to a severe insult.

To aid in remembering the common causes of delirium, Aldecoa and colleagues (2017) proposed the mnemonic "I WATCH DEATH," which summarizes the primary etiological factors:

- **I (Infections):** Post-surgical infections
- **W (Withdrawal):** Alcohol or drug withdrawal
- **A (Acute metabolic):** Acute metabolic imbalances
- **T (Trauma):** Physical trauma
- **C (CNS pathology):** Central nervous system disorders
- **H (Hypoxia):** Inadequate tissue oxygenation
- **D (Deficiencies):** Deficiencies in vitamins and minerals, especially B12 and folate
- **E (Endocrinopathies):** Hormonal imbalances and endocrine disorders
- **T (Toxins):** Medications or environmental toxins
- **H (Heavy metals):** Accumulation of heavy metals such as lead or mercury

In the development of postoperative delirium, the interplay between patient-specific predisposing factors and perioperative stressors plays a crucial role. Understanding this complex interaction begins with a thorough identification of both types of risk factors across all phases of the surgical process—preoperative, intraoperative, and postoperative.

Preoperative Risk Factors

Identification of risk factors during the preoperative period is crucial for the early detection of postoperative delirium. Age is considered one of the strongest predictors for the development of postoperative delirium. Physiological changes in the central nervous system associated with aging include neurotransmitter imbalances, decreased cortical function, and reduced brain reserve capacity. These alterations increase patients' vulnerability to the stressful environments of the operating room and hospital, thereby elevating the risk of delirium (An et al., 2023). Numerous studies have reported a significant increase in delirium risk in patients over 70 years of age, with the likelihood rising further as age advances (Zhang et al., 2020; Wang et al., 2018; Bramley et al., 2021).

Cardiovascular diseases—particularly diabetes, hypertension, coronary artery disease, and heart failure—are significant preoperative contributors to the development of postoperative delirium (Bramley, 2021). These conditions may impair cerebral perfusion and result in cognitive dysfunction. Decreased cognitive reserve renders brain functions more susceptible to stress (Liu et al., 2023; Pehlivan, 2015). Patients with preexisting cognitive impairments, including dementia, Alzheimer's disease, or other neurodegenerative and psychiatric disorders, are at elevated risk. Therefore, evaluating cognitive function preoperatively is a critical step in identifying delirium risk and planning postoperative monitoring (Zhang et al., 2020; Liu et al., 2023; Pehlivan, 2015).

Additional predisposing factors include reduced physical capacity, dependence in activities of daily living, frailty, and social isolation. Psychiatric conditions such as depression may contribute directly through neurological pathways or indirectly by deteriorating the patient's overall clinical status, thus increasing susceptibility to delirium (Pehlivan, 2015; Bramley et al., 2021).

Alcohol dependence or substance use also heightens the risk of postoperative delirium. Withdrawal symptoms and systemic stress following surgery can act as triggers in these patients. Moreover, individuals residing in nursing homes or long-term care facilities—where cognitive reserve is often diminished—are also more prone to develop postoperative delirium (Bramley et al., 2021; Pehlivan, 2015).

Intraoperative Risk Factors

Prolonged and invasive surgical procedures—such as orthopedic or thoracic surgeries—significantly increase the risk of postoperative delirium. Hip fracture surgery, in particular, is among the highest-risk procedures, with reported incidence rates ranging from 35% to 65% (Bramley et al., 2021; Pehlivan, 2015). Contributing factors include the urgency of the procedure, inadequate preoperative preparation, and high comorbidity burden (An et al., 2023; Pehlivan, 2015).

Intraoperative complications such as hypotension, hypoxemia, hypercapnia, major blood loss, and the need for transfusion can disrupt cerebral perfusion and oxygenation, thus triggering delirium (Pehlivan, 2015; Liu et al., 2023). In a study conducted by Fenta et al. involving 424 elderly patients, a statistically significant association was found between prolonged surgical duration, intraoperative blood loss exceeding 1000 mL, and the incidence of postoperative delirium. Accordingly, maintaining stable hemodynamics during surgery, especially in older patients, is considered a fundamental preventive strategy (Liu et al., 2023; Pehlivan, 2015).

Although general anesthesia has been linked to increased delirium risk in some studies, randomized controlled trials have shown no significant difference in delirium incidence between general and spinal anesthesia (Bramley et al., 2021).

Postoperative Risk Factors

Various conditions occurring during the postoperative period—such as pain, hypoxia, infections, malnutrition, and emotional deprivation—facilitate the onset of postoperative delirium. Many of these are modifiable, and with appropriate management, the development of delirium can largely be prevented (Bramley et al., 2021; An et al., 2023). Studies have demonstrated that increased pain scores postoperatively are associated with higher rates of delirium, and that early administration of analgesia can significantly reduce this risk (Liu et al., 2023; White et al., 2024).

Electrolyte imbalances, dysglycemia, hypoproteinemia, and anemia are biochemical parameters that may adversely affect brain metabolism and contribute to the onset of delirium (Bramley et al., 2021). Low serum albumin may reflect both malnutrition and impaired liver function, and the resultant deficiency of albumin—a vital antioxidant for the brain—can exacerbate cognitive dysfunction (Bramley et al., 2021). The use of benzodiazepines and anticholinergic medications further increases risk by interfering with key

neurotransmitter systems implicated in delirium pathophysiology. Therefore, it is recommended to minimize or avoid the use of these agents during the perioperative period (Bramley et al., 2021; Liu et al., 2023).

Management of Delirium

The most effective approach to delirium treatment is prevention. The American Geriatrics Society (2021) guidelines recommend conducting risk assessments, adopting a multidisciplinary approach, implementing non-pharmacological preventive interventions, educating patients and their families, and applying delirium prevention programs. Similarly, the National Institute for Health and Care Excellence (NICE, 2023) emphasizes systematic daily risk assessment, a multidisciplinary multicomponent intervention program, regular monitoring, and the use of appropriate assessment tools. While recommending pharmacological treatment only in low doses when necessary, the guidelines underline that non-pharmacological interventions should be prioritized.

In the diagnostic process of postoperative delirium, it is essential to obtain a comprehensive medical history, systematically observe behaviors, conduct detailed cognitive function assessments, and integrate findings through careful clinical evaluation. This holistic approach is vital for achieving an accurate diagnosis. Once delirium develops, potential underlying causes such as infections, acute pain, hypoxia, fluid-electrolyte imbalance, constipation, and urinary retention should be rapidly identified and addressed. However, in settings like intensive care units, effective communication with patients becomes more challenging, complicating the recognition and diagnosis of delirium (Bozkul et al., 2023; Kubat & Ergin, 2024).

At this point, nurses play a crucial role. As healthcare professionals who spend the most time with patients in the postoperative period, nurses are in a prime position to observe behavioral changes closely. Nevertheless, research indicates that many nurses lack sufficient knowledge about the symptoms, risk factors, and management of delirium (Temiz & Sayılan, 2021). Postoperative delirium is frequently observed, especially in elderly and high-risk individuals. Therefore, it is of great importance that nurses involved in pre- and postoperative care can recognize delirium risk, detect early symptoms, and take appropriate preventive measures (Bozkul et al., 2023; Kubat & Ergin, 2024).

Various reliable assessment tools are available for the early detection and appropriate management of delirium. Among these, the Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening

Checklist (ICDSC) are widely used in intensive care units. For monitoring cognitive status, tools such as the Neelon and Champagne Confusion Scale, the Richmond Agitation-Sedation Scale (RASS), and the Nursing Delirium Screening Scale (Nu-DESC) are recommended. Regular use of these tools during the preoperative period and early postoperative phase facilitates early detection and timely clinical intervention (Erbay & Kelebek Girgin, 2020; Bozkul et al., 2023).

Non-Pharmacological Intervention Approaches

Delirium Prevention with the ABCDEF Bundle

The ABCDEF bundle, widely used in intensive care units and postoperative follow-ups, provides a comprehensive framework for delirium prevention. This approach is a multicomponent strategy focused on non-pharmacological interventions. Each component includes evidence-based practices:

A: Assessment, prevention, and management of pain

B: Both spontaneous awakening and breathing trials

C: Choice of appropriate analgesia and sedation

D: Delirium assessment, prevention, and management

E: Early mobility and exercise

F: Family engagement and empowerment

These components not only help prevent the development of delirium but also reduce ICU length of stay and improve survival rates (Kılıç & Kav, 2022).

Physiological Support and Clinical Monitoring

Ensuring physiological stability is a fundamental step in preventing delirium. Important interventions include early evaluation of nutritional status and initiation of enteral feeding, correction of electrolyte imbalances, control of hypo/hyperthermia and pain, management of hypoxia, and effective treatment of infections. Physical restraints that may trigger delirium should be avoided whenever possible. Invasive procedures such as catheters and nasogastric tubes should be used only when necessary and removed promptly when no longer required (Kılıç & Kav, 2022; Mendez-Martinez et al., 2021; NICE, 2023).

Inadequate pain control is a significant factor that can trigger postoperative delirium. Even in patients unable to express pain verbally, appropriate

analgesia should be provided based on behavioral cues (Kılıç & Kav, 2022; NICE, 2023).

Cognitive and Sensory Interventions

Supporting cognitive functions in postoperative patients is an effective and priority approach to preventing delirium. Orientation can be enhanced by placing a current clock and calendar in the patient's room, having nurses introduce themselves during communication, and regularly informing the patient of the time and place. Personal belongings (e.g., family photographs, a familiar blanket) should be kept at the bedside, and memory-supporting activities such as listening to music or reminiscence therapy should be encouraged. Sensory stimuli like television or radio should be personalized. As visual and hearing impairments increase delirium risk, facilitating the use of eyeglasses and hearing aids and addressing treatable issues such as earwax buildup is essential (Kılıç & Kav, 2022; Mendez-Martinez et al., 2021).

Sleep and Environmental Regulation

Maintaining the sleep-wake cycle plays a critical role in delirium prevention. ICU and postoperative environments often cause sleep disturbances due to noise, light, and continuous monitoring. To maintain sleep hygiene, natural light should be used during the day, and dim lighting should be used at night. Alarm sounds from medical devices should be reduced, staff movement minimized, and earplugs used when necessary. During nighttime, medication administration and vital sign monitoring should be minimized to allow uninterrupted sleep. Providing eye masks and reducing distractions such as television are also recommended (Kılıç & Kav, 2022; Mendez-Martinez et al., 2021; NICE, 2023).

Early Mobilization

Early initiation of active and passive exercises in the postoperative period enhances physical well-being and shortens the duration of delirium. Mobilizing patients as early as possible after surgery is a critical intervention, particularly for those in intensive care (Kılıç & Kav, 2022; Mendez-Martinez et al., 2021; NICE, 2023).

Family Involvement

Maintaining communication with the patient's social environment helps reduce anxiety and agitation, thereby lowering the risk of delirium. Supporting family visits provides reassurance to the patient and assists with orientation. Flexible visiting hours and including family members in the care

process—such as allowing them to be present during meals—can reduce the risk of delirium (Mendez-Martinez et al., 2021; NICE, 2023).

Individualized Intervention Packages

Patients at risk of delirium should be assessed within the first 24 hours of admission, and individualized multicomponent intervention packages should be developed. Implementing these interventions through teams trained in delirium care is effective in reducing the incidence of delirium (NICE, 2023). Intervention plans should be tailored by considering the patient's cognitive status, existing comorbidities, medication use, sensory limitations, and environmental stressors. Rather than using single interventions, combining multiple strategies—such as orientation, cognitive stimulation, sensory support, sleep hygiene, and family involvement—produces more effective results (Mendez-Martinez et al., 2021; NICE, 2023). Numerous studies have demonstrated that multicomponent non-pharmacological protocols are more effective than single interventions in preventing postoperative delirium. A meta-analysis by Liang et al. (2021) showed that combinations of cognitive stimulation, family involvement, environmental adjustments, and sleep hygiene significantly reduce the incidence and duration of delirium.

Pharmacological Interventions

The primary goal in managing delirium is to identify and eliminate underlying etiological factors. Pharmacological methods do not reduce delirium severity, treat its cause, or affect mortality. Therefore, drug therapies typically serve a limited and supportive role and are considered only under specific clinical circumstances (Jin et al., 2020; Mossie et al., 2022).

Pharmacological treatments should be considered for cases that do not respond to non-pharmacological interventions or where delirium poses a threat to patient or environmental safety. Before initiating drug treatment, a comprehensive evaluation of the patient's clinical condition should be conducted, reviewing possible triggers such as pain, hypoxia, metabolic disorders, infections, and environmental stressors (Jin et al., 2020; Mossie et al., 2022).

Benzodiazepines should be avoided unless there is a specific indication, particularly in patients with pre-existing cognitive impairment (Jin et al., 2020). Recent studies have shown that dexmedetomidine reduces intraoperative sedation needs and decreases postoperative antipsychotic use and ICU length of stay. Therefore, it is considered an effective option, especially for high-risk patients (Lee et al., 2021; Mossie et al., 2022).

Other noteworthy agents include intraoperative magnesium sulfate and postoperative intravenous acetaminophen, both of which have been shown to reduce agitation and indirectly lower the risk of delirium (Subramaniam et al., 2019; Mossie et al., 2022).

In hyperactive delirium, particularly when the patient poses a risk of harm, low-dose haloperidol may be effective. However, its use in patients with cardiac risk requires caution and close ECG monitoring (Mossie et al., 2022; Jin et al., 2020).

Conclusion

Postoperative delirium in elderly patients is a significant cause of morbidity and mortality. Early diagnosis and effective management play a decisive role in improving patient outcomes. Nurses have critical responsibilities in preventing and managing delirium, including reorientation, environmental regulation, early mobilization, and nutritional support, all through multicomponent, non-pharmacological interventions. Increasing the evidence base for the effectiveness of these interventions is essential. Systematic risk assessment during the preoperative, intraoperative, and postoperative periods, along with implementation of the ABCDEF bundle, is crucial for the holistic management of patients' cognitive, physiological, and environmental needs. Pharmacological treatment should only be used cautiously and at low doses when necessary. Enhancing healthcare professionals', especially nurses', awareness and knowledge of delirium is vital for early detection, effective management, and ensuring patient safety. Future research is needed to strengthen the evidence supporting non-pharmacological interventions and to optimize multidisciplinary approaches.

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CHAPTER 12

EVALUATION OF A PATIENT DIAGNOSIS WITH COLORECTAL CANCER ACCORDING TO OREM'S SELF CARE DEFICIT THEORY: A CASE REPORT

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Introduction

Building nursing science on a theoretical foundation is crucial for the development of the profession, standardization of practice, and professionalization. Nursing theories provide a conceptual structure to the care process and provide systematic direction to nursing education, practice, management, and research (Demirbağ, 2021). Through these theories, nurses have the opportunity to assess individuals' health status with a more holistic and objective approach, organize and analyze data collection, and interpret the information obtained based on scientific principles (Şengün et al., 2013). Furthermore, this theoretical framework contributes to the creation

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of a common language and the provision of nursing care in accordance with universal principles, thus strengthening professional standards (Bilgehan, Koç, & İnkaya, 2020; Selçuk & Demirdağ, 2019; Şengün et al., 2013; Zuhur & Özpancar, 2017). Colorectal cancer is one of the most common cancers worldwide with a significant mortality rate. According to 2018 global statistics from the International Agency for Research on Cancer (IARC), colorectal cancer ranks third among all cancers and poses a significant public health problem with a 10.2% incidence and 9.2% mortality rate (WHO & IARC, 2018). In Turkey, according to 2015 data from the Turkish Statistical Institute, colorectal cancer is among the most common cancers, with an incidence of 23.1 per 100,000 in men and 14.4 per 100,000 in women (TÜİK, 2015). These high incidence and mortality rates highlight the importance of colorectal cancer diagnosis, treatment, and care. The treatment process for individuals diagnosed with colorectal cancer requires a multifaceted approach, including surgical interventions, chemotherapy, radiotherapy, and supportive care. During this process, individuals experience a significant increase in their self-care needs, and their quality of life is negatively affected by various physical and psychosocial effects (Demirkaya et al., 2023). Frequently observed conditions such as fatigue, loss of appetite, pain, bowel irregularities, changes in body image, and loss of independence limit an individual's self-care capacity and necessitate professional nursing support. At this point, basing nursing care on theoretical foundations allows for more effective and systematic identification of an individual's self-care needs (Özkan & Ünal, 2022). The "Self-Care Deficit Nursing Theory," developed by Dorothea Elizabeth Orem, is one of the most important theories frequently used in nursing science and defines nursing roles based on an individual's self-care capacity (Berbiglia, 2014; Erdogan et al., 2023).

Orem focuses on the self-care activities that are necessary for an individual to maintain their health and perform life activities independently. However, he states that when the individual is unable to perform these activities alone, the nurse should step in and provide care support to address the individual's deficiencies (Bilgehan et al., 2020). Orem's theory consists of three main components: Self-Care Theory, Self-Care Deficit Theory, and Nursing Systems Theory (Selçuk & Demirbağ, 2019). This tripartite structure provides the opportunity to systematically analyze the roles of the nurse in the care process and the patient's needs level (Birol, 2004; Velioğlu, 2012). Orem's theory has been applied in studies with many patient groups in Turkey, and various results have been obtained. This theory, which is used in a wide range of settings, from adolescents with alcohol dependence to asthma patients, from pregnant women to individuals with hypertension and

renal failure, from elderly patients to individuals with spinal cord injuries, has made significant contributions to determining the individual's self-care needs, establishing nursing diagnoses, and planning appropriate interventions (Çelik, 2019). This theoretical approach enables a holistic assessment of the patient's physical, psychological, and social needs; it allows the nurse to shape the care plan specific to the individual (Selçuk and Demirbağ, 2019). In diseases that seriously affect quality of life and functional capacity, such as colorectal cancer, the nursing approach to self-care deficit gains great importance (Demirkaya et al, 2023). Especially in the post-surgical period, the inability of individuals to independently maintain their daily living activities increases the need for self-care support. In this case report, the self-care problems experienced by a patient who underwent surgery for advanced colon cancer were evaluated based on Orem's Self-Care Deficit Theory. The aim of the study is to systematically determine the deficiencies in the patient's self-care capacity, to establish appropriate nursing diagnoses, and to plan and present individual-specific nursing interventions. With this theoretical approach, it is aimed to provide nursing care not only based on practice but also supported by scientific and theoretical foundations.

Case Report

This study examines the clinical course of S.U., a 74-year-old male patient evaluated within the framework of Orem's Self-Care Deficit Theory. The patient, a high school graduate, was not currently engaged in any professional activity. He presented to the emergency room with complaints of abdominal pain, nausea, vomiting, and inability to pass gas or stool for four days. Following examination and laboratory evaluations, he was diagnosed with ileus and admitted to the general surgery ward. He had no previously diagnosed chronic disease, regular medication use, or known allergy history. However, it was determined that the patient had not sought preventive healthcare services such as cancer screenings and had neglected regular health checks. Following hospitalization, advanced imaging and laboratory tests revealed the diagnosis of stage 4 colon cancer and coexisting hypertension. The initial surgical procedure involved a subtotal colectomy, cholecystectomy, and liver lobectomy. However, an anastomotic leak developed on the 7th postoperative day, resulting in a colostomy. During the same period, an infection developed at the surgical wound; cultures revealed growth of Vancomycin-resistant Enterococcus (VRE), and appropriate antibiotic therapy was initiated. The wound did not heal completely for approximately six months, requiring five stitches during this period. Due to delayed wound healing, the planned chemotherapy treatment could not be

initiated, and the patient turned to supportive phytotherapy as an alternative. All these clinical developments negatively impacted both the patient's physical health and psychosocial well-being, significantly increasing her self-care needs. Assistance with activities of daily living, such as colostomy care, personal hygiene, mobilization, nutrition, and emotional support, was particularly needed. Loss of individual independence, decreased quality of life, social withdrawal, and distorted body image necessitated a holistic approach to patient care from a nursing perspective.

Based on Orem's Self-Care Deficit Theory, the nursing assessment yielded the following nursing diagnoses:

• Acute pain: Post-surgical pain originating from the wound and gastrointestinal tract causes pain that limits daily activities.

• Risk of infection: The risk of infection persists due to a history of infection and resistant bacterial colonization at the wound site.

• Delayed wound healing: The wound has not healed for six months and the need for repeated stitches supports this condition.

• Lack of self-care: The patient requires external assistance with personal hygiene, colostomy care, and nutrition.

• Constipation: Constipation is experienced due to irregular bowel function and limited mobility after surgery.

• Activity intolerance: Prolonged bed rest, fatigue, and decreased motivation have limited physical activity.

• Lack of knowledge: Insufficient knowledge was identified regarding diagnosis, treatment, stoma care, and wound management.

• Changes in family processes: Changes in the roles of family members have been observed due to the burden of caregiving. • Social isolation: Social withdrawal occurs due to the disease, changes in appearance, and loss of self-confidence.

• Impaired gas exchange: Shallow breathing and decreased lung capacity are observed in the postoperative period.

• Anxiety: Intense anxiety is present due to the course of the disease, uncertainty about the future, and the uncertainties of the treatment process.

These nursing diagnoses comprehensively outline the patient's self-care needs and form the basis for planning the nursing care process based on Orem's theory.

Assessment

The assessment, conducted within the framework of Dorothea Orem's Self-Care Deficit Theory, revealed the gap between the patient's current self-care capacity and the needs they need to meet. The individual experienced a significant decrease in physical function due to surgical procedures, stoma creation, wound complications, and the disease process, directly impacting self-care behaviors. According to Orem, an individual's self-care needs are related to variables such as age, health status, social support, learning level, and environmental conditions. When evaluating Patient S.U.'s current situation, a care model requiring a fully supportive nursing system emerged. The individual became dependent on healthcare personnel for basic life activities such as stoma care, wound dressing, mobilization, diet, medication management, and psychosocial support. Furthermore, factors such as inadequate knowledge of the disease process, anxiety, social isolation, and changes in family roles increased both individual and environmental support needs. In this framework, nursing diagnoses are detailed in both physical and psychosocial areas in line with the individual's self-care deficiencies.

Nursing Care Interventions (Based on Orem's Nursing Systems Theory)

Nursing interventions for patient S.U. were planned in line with Orem's total supportive systems approach. In this system, the nurse directly assumes or guides all of the patient's self-care needs. The basic interventions planned for each nursing diagnosis are summarized below:

Physical Interventions:

• Acute pain: The level of pain was determined using pain assessment scales, analgesic medication administration was monitored, and non-pharmacological methods (positioning, cold/heat applications) were used as supportive measures.

* On the VAS-Pain (0-10) scale, the pain score was determined to have decreased from 8 to 4.

• Delayed wound healing: Daily wound care was performed, aseptic techniques were followed, and the wound size, color, and discharge were regularly monitored.

* As a result of the implemented nursing interventions, progress was made in the wound healing process, with a decrease in signs of infection

and improved tissue integrity. The patient's body temperature decreased from 38°C to 36.6°C, no signs or symptoms of infection were detected at the intravenous (IV) catheter insertion site, wound, or stoma site, and the WBC value decreased from 15,810 μL to 5,280 μL.

• Constipation: Nutritional counseling was provided, fluid intake was increased, and appropriate laxative treatment was prescribed with a physician's recommendation.

* As a result of the interventions, the patient's bowel frequency increased from twice a week to once a day, and a decrease in abdominal pain and abdominal distension was observed.

• Impaired gas exchange: Lung capacity was supported with breathing exercises and position changes.

* Following the interventions, the patient's peripheral oxygen saturation (SpO_2) increased from 88% to 95%, his respiratory rate decreased from 26 to 20 per minute, a decrease in rhonchi was observed on lung auscultation, and an arterial blood gas analysis recorded a PaO_2 value of 80 mmHg.

Self-Care and Education:

• Lack of self-care: Assistance was provided to the individual with dressing, personal hygiene, nutrition, and bowel movements; training was provided to develop step-by-step skills to gain independence in the future.

* As a result of the interventions implemented, the patient was able to maintain personal hygiene and nutrition without assistance and began to independently meet 50% of her dressing and bowel movements.

• Lack of knowledge: Written and verbal training was provided regarding stoma care, wound management, medication, and the course of the disease.

* As a result of the training, it was observed that the patient and caregiver were able to perform stoma and wound care procedures correctly and safely, adhered to medication, and their knowledge about the course of the disease increased.

• Change in family processes: Family members were interviewed, and their active participation in the care process was encouraged.

* As a result of the interventions implemented, an increase in family members' participation in the care process was observed, communication between the patient and family was strengthened, and continuity of care was achieved.

Psychosocial Interventions:

• Anxiety: The individual was given the opportunity to express their feelings and thoughts; if necessary, they were referred to psychological counseling services.

* The patient reported feeling relieved when they had the opportunity to express their feelings; a decrease in anxiety was observed during this period. The evaluation noted a decrease in their Beck Anxiety Inventory score from 27 to 12.

• Social isolation: Suggestions for activities to encourage social interaction were provided, and access to support groups was provided.

* As a result of the interventions, the patient's participation in social settings increased, feelings of loneliness decreased, and a significant improvement was observed in their desire to communicate.

Discussion

This case demonstrates how Orem's Self-Care Deficit Theory can be used as a constructive tool in nursing practice. The theory provided a systematic way to identify deficiencies in an individual's self-care capacity, select a nursing system (fully supportive, partially supportive, or educational-supportive), and plan appropriate interventions. When examining the case of Patient S.U., factors such as multiple surgical procedures, wound infection, and delays in treatment negatively impacted both the individual's physical independence and psychosocial integrity. The theoretical framework provided by the theory allowed the nurse to conduct a multidimensional assessment not only of current symptoms but also of the individual's daily living activities, self-efficacy, knowledge level, and support systems. Furthermore, Orem's approach recommends that the care process should be integrated not only between the nurse and the patient, but also the family and community as active components. In this context, strengthening the family support system is critical for continuity of care.

Conclusion and Recommendations

This case report covers the assessment of the self-care needs of a patient diagnosed with colon cancer who underwent major surgery and experienced multiple complications, based on Orem's Self-Care Deficit Theory, and the planning of individualized nursing interventions. As a result of the nursing care provided, a significant increase was achieved in the patient's

self-care agency; independence was particularly supported in areas such as wound care, mobilization, and stoma management. These improvements demonstrate that not only the patient's physical but also their psychosocial well-being were positively impacted. Systematic nursing care, implemented in line with Orem's theoretical framework, offered a holistic and structured approach specific to the individual's needs. The theory established a functional framework for determining nursing diagnoses and individualizing interventions, ensuring that the care process was grounded in scientific principles. Accurate assessment of self-care capacity prevented the patient from developing unnecessary dependency and strengthened their ability to maintain their own care. This directly contributed to improving their quality of life. Furthermore, multidisciplinary teamwork and effective family support during the care process enhanced the effectiveness of nursing care. It has enabled the holistic addressing of patients' physical, emotional, and social needs. The application of systematic nursing models, such as Orem's theory, particularly in the post-oncological surgery period, significantly supports patient independence and the process of adapting to their health. In this context, it is recommended that Orem's Self-Care Deficit Theory be used more widely, systematically, and functionally in nursing education and clinical practice. This approach will not only improve the quality of nursing care but also make significant contributions to strengthening professional standards and grounding care processes in scientific foundations. Furthermore, it is believed that case-based applications for similar patient profiles can be considered clinical guidance in terms of integrating theoretical knowledge into practice in nursing.

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CHAPTER 13

FOREIGN BODY INSERTION DURING A WEDDING DRESS REHEARSAL: A CASE REPORT BASED ON WATSON THEORY

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Purpose

The purpose of this case report is to evaluate the physical and emotional care needs of a young woman who had to seek health care after a foreign object (needle) stuck in her left shoulder area during a wedding dress fitting, in line with Jean Watson's Human Caring Theory. The effect of theoretically based nursing care on the well-being of the individual is emphasized in the case report.

Introduction

Foreign bodies can cause various complications such as pain in soft tissue, allergic and toxic reactions, tumor-like formations, inflammation, infection,

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vascular occlusion, erosion and thrombus formation. Especially sharp-tipped foreign bodies can progress through the tissue and cause damage to tendons and neurovascular structures. There is a risk of developing septic arthritis or osteomyelitis when they are located close to joints or bone tissues. In such clinical cases, basing nursing care on theoretical foundations facilitates the systematic assessment of the individual's needs and the planning of appropriate nursing interventions.

In this case report, the care process of a patient who was stuck in the left shoulder area with a needle during a wedding dress fitting is discussed within the framework of Jean Watson's Human Care Model. Watson's model is a holistic approach consisting of ten basic processes that are centered on the individual, interrelated and not separated by clear boundaries. The model is based on the human care approach that forms the essence of nursing in reducing negative emotions that arise during the disease process, supporting the individual's coping skills with the disease and managing the adaptation process.

Case

Female patient B.K., 26 years old and working as a nurse. The patient, who applied to the emergency room due to the pain that developed after a needle prick to her left shoulder area 3-4 days ago, gradually increased and became unbearable in the last period, has no known systemic disease or history of allergy. A foreign body was detected in the soft tissue of the left shoulder as a result of tomography and she was admitted to the orthopedic service. Her vital signs were stable. The foreign body was removed with a surgical intervention performed under general anesthesia, the postoperative period was uneventful and the patient was discharged the day after the operation. Watson's Theory of Human Caring does not limit nursing practice to physical interventions only, but aims to touch all existential dimensions of the individual.

Conclusion

In this case, which was addressed within the framework of Watson's theory, the importance of evaluating the emotional and social well-being of a young nurse, as well as her physical injury, was emphasized within nursing care. The holistic nursing approach, which was carried out by taking into account the individual's professional identity, future plans and emotional needs, made a positive contribution to the healing process. While this case shows that nurses should not neglect their own health, it also reveals once

again the importance of compassionate, respectful and holistic care in patient-nurse interactions.

Keywords: Nursing care, Watson's Human Caring Theory,Surgical Treatment

Introduction

The goal of the nursing profession is to translate theoretical knowledge into practice. One of the most effective ways to translate this knowledge is through the use of theories and models. When used in nursing practice, theories and models elevate practices, guide initiatives, and help improve the quality of care (Velioğlu, 2012; Tomey, 2006).

The "Human Caring Model" is a model developed by Watson (Erbay et al., 2018). The model reflects the entirety of nursing by addressing the interpersonal process that develops between the care recipient and the caregiver (Aktürk, 2016).

The Human Caring Model has three main themes: the interpersonal caring relationship, the care situation and moment of care, and healing processes (Bozkuş and Olgun 2019; Gümüş and Dinçer 2024; Özgürsoy et al., 2015).

The individual's first encounter with a nurse is defined as the "moment of care." The nurse communicates with all her being to make this moment meaningful for the patient. Through body language, tone of voice, and word choices, she conveys sincerity and concern. This holistic approach fosters a strong empathic bond with the patient and enhances the effectiveness of nursing care (Özgürsoy et al., 2015).

In Watson's Human Caring Model, healing processes form the foundation of nursing. All stages of the healing process interact (Okumuş, 2012; Durgun et al., 2013).

The model can be easily applied to various fields of nursing and to individuals of different ages. In this study, it was believed that the nursing care provided following a foreign body (needle) stick would be an appropriate guide for maintaining and improving well-being in line with Jean Watson's Human Caring Theory.

Foreign bodies can cause pain, allergic and toxic reactions, tumors, infection, and thrombus formation in the soft tissue. Sharp-tipped objects can penetrate the tissue and cause tendon and neurovascular injuries (Callegari et al., 2009; Uludağ et al., 2019).

A thorough clinical examination and radiological evaluation are crucial in the diagnosis of soft tissue foreign bodies. Plain radiographs, computed tomography, ultrasonography, and magnetic resonance imaging techniques can be used for diagnosis. Computed tomography is superior to plain radiographs and can detect a wider variety of foreign body types. Ultrasonography is a widely accepted and highly useful radiological examination for detecting non-opaque foreign bodies that cannot be seen on plain radiographs (Yang et al., 2013).

Suture needles are a rare cause of injury and enter the body through swallowing, inhalation, or skin contact. Clinical diagnosis can be made using plain radiographs, ultrasonography, and tomography. A sewing needle appears on X-ray as a long, thin object that creates opacity in the area where it is located. Sometimes, history-taking can be difficult and is detected incidentally radiologically (Ünal et al, 2005).

This case report aims to assess the physical and emotional care needs of a young woman who was forced to seek healthcare after being stabbed in the left shoulder by a foreign object (needle) during a wedding dress fitting, in line with Jean Watson's Theory of Human Caring. The case report emphasizes the impact of theoretically based nursing care on the individual's well-being.

Ethical Aspects of the Case

Participation in the study was based on the principle of voluntariness. The purpose of the study was explained to the patient beforehand. Informed consent was obtained from the patient who agreed to participate in the study, stating that the information would be evaluated solely by the researcher. To protect the individual's privacy, no names were given; only the initials of their first and last names, "B.K." Because this is a case report, no ethics committee approval was sought.

Case Report

Data for the study was collected using a data collection form based on literature to assess the patient's socio-demographic characteristics, history, and systems, and through a physical examination.

Sociodemographic characteristics: B.K., a 26-year-old female patient, is single and works as a nurse.

Past health history: The patient has no known systemic disease or allergy history.

Current health history: The patient presented to the emergency room due to pain in her left shoulder region that had persisted for 3–4 days, gradually increased, and had recently become unbearable.

Clinical course of the case: CT scan revealed a foreign body (needle) in the soft tissue of her left shoulder, and she was admitted to the orthopedic ward. Her vital signs and laboratory results remained stable during the perioperative period. Surgery was performed under general anesthesia, and the foreign body was removed. Postoperative course was uneventful, with no complications, and the patient was discharged the day after the operation.

NURSING INTERVENTIONS AND ASSESSMENTS APPLIED TO THE CASE ACCORDING TO WATSON'S HUMAN CARING MODEL

STAGES OF THE MODEL	APPLIED NURSING INTERVENTIONS	EVALUATIONS
1. INTERPERSONAL CARE RELATIONSHIP	An empathetic approach was employed to establish friendly, sincere communication. Expressing feelings was encouraged.	She expressed her sadness at encountering such an incident before the wedding preparations.
2. MAINTENANCE STATUS-MAINTENANCE MOMENT	The moment when the patient was introduced and communication began was called the care moment. A history was taken in a friendly tone. A physical assessment was performed, respecting patient confidentiality. Nursing needs were identified, and interventions were planned. Information about the upcoming surgery was provided.	The patient's satisfaction with participating in care increased the patient's compliance with the nursing process.
3. Healing Processes		
Steps of the Healing Process		
3.1. Humanism-Devotion	A sincere and friendly approach was adopted during the medical history. The patient's professional identity and personal life plans (e.g., wedding dress fitting) were carefully considered throughout the care process.	She expressed her feelings and thoughts easily.

3.2. Faith-Hope	Eye contact was maintained throughout the communication. The patient was informed about the entire process and encouraged to feel hopeful.	She was observed expressing himself more freely. He stated that he was very happy with the attention he received.
3.3. Sensitivity	She was encouraged to express her feelings. She talked about her fears during the recovery phase.	She expressed her feelings openly.
3.4. Help-Trust Relationship	An empathic approach was demonstrated to the patient, who avoided seeking healthcare for days despite the pain, and the reasons for self-neglect were addressed through supportive communication.	The patient stated that she felt valuable and useful.
3.5. Expression of Positive and Negative Emotions	A sincere, trusting communication was provided to express her feelings.	She was able to express her feelings.
Steps of the Healing Process (Continued)		
3.6. Problem Solving	During the dressing change, the wound was assessed for signs and symptoms of infection. The patient was informed of this. Information regarding infection risk was provided.	The patient stated that he knew what to do and what to do at the wound site. The patient, who rated his pain as a seven out of ten, rated his pain as a one out of ten after pharmacological treatment.
3.7. Teaching-Learning	After discharge, information was given about dressing and home care.	She stated that her fears decreased after discharge because her participation in the surgical process was ensured.
3.8. Healing Circle	Not only the physical recovery of the patient but also the preservation of emotional confidence and professional motivation are included in the care process.	
3.9. Help with Requirements	Support was obtained from the patient's family and loved ones.	The patient stated that as her hopelessness decreased during the recovery process, she would get through this process more easily with the support of her family.
3.10. Allowing for Ontological-Phenomenological Spiritual Dimensions	Their practices that made them feel good were supported.	She stated that being able to open up to others and crying gave her great relief.

Conclusion and Recommendations

This case, analyzed within the framework of Watson's theory, emphasized the importance of considering a young nurse's emotional and social well-being, in addition to her physical injury, within nursing care. A holistic nursing approach, which considers the individual's professional identity, future plans, and emotional needs, positively contributed to the healing process. This case demonstrates that nurses should not neglect their own health and also reiterates the importance of compassionate, respectful, and holistic care in patient-nurse interactions.

Therefore, nursing care provided in this manner ensures that individuals are addressed from a mind-body-spirit perspective, contributes to the individual's healing process, and enhances both patient satisfaction and the nurse's professional satisfaction through the interpersonal care relationship. Ensuring mutual satisfaction will also be a key factor in improving the quality of healthcare.

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CHAPTER 14

COMMONLY USED MEDICATIONS IN THE EMERGENCY DEPARTMENT

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Hande CENGİZ AÇIL[2]

ABSTRACT

Drugs are substances that, when ingested by a living organism, cause changes in the functioning of the body. Medication errors are defined as "any preventable event that may cause improper use or harm to the patient while under the control of healthcare professionals, the patient or the individual". When drugs are used correctly, negativities that threaten human health and life can be prevented, but when used incorrectly, they can cause undesirable situations that may occur until the end of life. Since the emergency department is a clinic that needs emergency medical attention, it is vital to apply the right drug treatment in a timely and effective manner. The use of medication in the emergency department includes intervention in conditions that may lead to mortality or morbidity that require immediate treatment. Correct treatment is important in order to reduce the effects of symptoms such as pain, fever and nausea, which seriously affect the quality of life of patients. In terms of correct drug use in the emergency department, it is important for health professionals to have a good knowledge of their quick decision-making skills, mechanisms of action and side effects of drugs. In

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addition, paying attention to drug interactions, using the right dosage and appropriate application methods are also important factors that increase the effectiveness of the treatment process. To reduce the risk of undesirable drug effects, before nurses start a new medication: Non-drug treatment should be considered. Care goals should be discussed with the patient and/or their relatives and determined within a time frame in which the benefit of drug therapy is expected. Indications should be evaluated for each new drug.

Keywords: Medicines, Emergency Service, Nursing

1. Introduction

Patient safety is paramount in healthcare systems. The goal is to prevent errors arising from healthcare services, investigate the cases resulting from these errors, and minimize their harm. Medication errors, the most common of medical errors, threaten patient safety due to morbidity and, most critically, mortality. While medication errors can have serious consequences, their preventability is a significant fact. Studies, largely based on voluntary reporting, have shown that only 5% of medication errors are reported, and these errors cause harm to patients. The National Coordinating Council for Medication Error Reporting and Prevention in the US, based on a review of numerous studies, has determined that more than 1.5 million people are harmed by medication errors each year. Medication errors are known to cause at least 7,000 deaths annually in the US, and the incidence of at least one medication error ranges from 2% to 14%. In the UK, medication errors are the second leading cause of medical incidents in hospitals, after patient injuries from falls. A study of 3,719 people in Utah and Colorado found that the rate of medication errors was 1%, and 59% of these errors were preventable. One of the most fundamental duties of emergency room nurses is administering medications. Patient safety must be a top priority in this role. Emergency room nurses are responsible for supporting this safety, mitigating risks, and reporting potential adverse events. Emergency room nurses must be able to accurately monitor the patient's treatment process by monitoring which patient, why, and how the medication should be administered, the correct dosage, the patient groups to which the medication should be avoided, specific storage conditions, and the potential side effects that may occur after administration. Before administering medication to a patient, four steps must be completed: ordering, receiving the order, preparing, and administering the medication. Nurses play a key role in the medication administration process and, therefore, must actively participate in preventing medication errors. (Ateş Ç. 2010)

2- Medicine And Its Definition

Drugs are substances that, when ingested by a living organism, alter body functions. In the science of medicine, known as pharmacology, a drug refers to a pure substance with biological activity (bioactive) used in medicine, or a mixture containing a standard amount of an equivalent active ingredient of plant or animal origin. The World Health Organization defines a drug as "a substance or product used or intended for use to modify or examine physiological systems or pathological conditions for the benefit of the user." Drugs play a crucial role in disease treatment. To be effective, drugs must be used regularly, in the correct form, and at the correct dosage. While drugs can prevent adverse events that threaten human health and life when used correctly, they can cause adverse events that can even lead to the end of life when used incorrectly. Emergency medications are used to control the vital functions of patients or accident victims whose condition is critical due to sudden events or illnesses, and to quickly and accurately resolve the critical moment between life and death. Depending on the situation, the healthcare provider must know precisely which drug to use, the dosage, and the route of administration.(Oktay Ş, 2009)

3- Medication Errors And Basic Principles

Medication errors are defined as "any preventable event that could lead to the improper use of medications by healthcare professionals, a patient, or an individual, or to patient harm." (http://www.fda.gov, 2013) Medication errors are categorized as follows: wrong patient, wrong drug, wrong dose, wrong formulation/presentation, wrong route and technique, wrong quantity, wrong labeling/instructions, contraindications, improper storage, omission/ neglect of a dose or medication, expired medication, drug-drug interactions, drug-food interactions, and adverse drug reactions.(WHO, 2009) Medication errors are the most common error affecting patient safety and are among the errors that most frequently lead to lawsuits against nurses. Unintentional medication errors are the single most common preventable cause of incidents. Errors occur in nearly half of all medication administrations.(Bath P ve ark., 2007) Medications play a crucial role in the treatment of diseases. For medications to be effective, they must be used regularly and correctly. While correct use can prevent adverse health and life-threatening complications, improper use can lead to life-threatening complications. Therefore, while medication administration may benefit patients, it is also cited as a source of potential risks. Ensuring patient safety is among the highest priorities of the healthcare system. Medication errors are one of the most significant threats

to patient safety and are among the most common medical errors.(Aygin, D, Cengiz, H, 2011) The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) defines a medication error as “a preventable event that results in harm to a patient from a medication, or inappropriate medication, despite the medication being under the control of the healthcare professional, patient, or manufacturer.(Frank-Stromborg M ve ark.,2007)

4- The Nurse’s Role And Legal Responsibilities In Medication Administration

In implementing the medical diagnosis and treatment plan, the nurse implements the treatments prescribed by the physician in writing, except in emergencies. She accepts the medical orders of the responsible physician for unexpected or sudden patient events or for diagnostic and treatment plans that require urgent implementation. During this process, she takes the necessary precautions for patient and staff safety. She fulfills the medical requests prescribed by the physician, if necessary, in accordance with health care, diagnosis, and treatment protocols established according to scientific principles. In cases where the physician anticipates that medical diagnosis and treatment procedures will harm the client, she discusses the situation with the responsible physician. If the physician insists on the procedure, she records the situation and performs the procedure upon the physician’s written request.(Resmi Gazete, 2010) The vast majority of healthcare professionals are unaware of the laws, statutes, and regulations that apply to them. According to Article 44 of the Turkish Penal Code, ignorance of the law is not an excuse. The law stipulates that nurses must administer treatment as directed and possess basic knowledge of any medication they administer. In our country, medical malpractice cases are prosecuted in accordance with private and criminal law. Articles 455 and 459 of the Turkish Penal Code are generally used to determine the criminal liability of healthcare professionals. Consequently, it is important for nurses to be aware of the situations that increase the risk of medical errors and to take the necessary precautions to prevent harm to the patient and their family and to protect themselves under the law.(West, J. B., Luks, A. M. 2021)

5- Medication Management In Emergency Respiratory System Diseases

Emergency respiratory diseases are clinical conditions that require rapid diagnosis and intervention and carry a high risk of mortality and

morbidity. Success in the management of these diseases depends on a thorough understanding of the pathophysiological mechanisms, accurate clinical assessment, and appropriate drug selection. In emergencies such as asthma attacks, COPD exacerbations, and pulmonary embolism, a rapid and effective treatment approach is lifesaving.(Gold Executive Committee, 2025) In COPD exacerbations, optimizing bronchodilator therapy and using appropriate doses of systemic corticosteroids are key approaches. Frequent administration of short-acting beta-2 agonists and early initiation of systemic corticosteroids are recommended for the management of severe asthma attacks. The treatment approach for pulmonary embolism is determined by risk stratification. Thrombolytic therapy is the primary consideration in high-risk patients, while anticoagulant therapy is the primary approach in moderate- and low-risk patients.(Konstantinides, S. V., Meyer, G., 2022) Successful drug management in emergency respiratory diseases depends on an understanding of the pathophysiological mechanisms and accurate clinical assessment. Implementation of structured treatment protocols based on current guidelines and patient-based risk assessment enhances treatment success.(WHO, 2023)

6- Medication Management In Cardiological Emergencies

More than half a billion people worldwide are affected by cardiovascular diseases. These diseases caused 20.5 million deaths in 2021, accounting for approximately one-third of all deaths globally.(G. De Luca, ve ark., 2004) Rapid diagnosis and treatment of cardiovascular diseases significantly reduces mortality. The principle of “Time is Gold” has always been a fundamental principle in cardiovascular diseases because every 30-minute delay in intervention, from the moment a patient enters the emergency room, results in a 7.5% relative increase in mortality.(Thygesen K, ve ark., 2018) Therefore, in the emergency room, where every second counts, it is crucial to quickly diagnose and initiate treatment for cardiovascular diseases. Drug Management in Acute Coronary Syndromes Acute coronary syndromes include patients presenting with recent changes in clinical symptoms and signs, with or without changes in 12-lead electrocardiograms or acute cardiac troponin elevations. Management of acute coronary syndromes begins with a thorough history and physical examination. The diagnosis of acute coronary syndrome is generally based on symptoms consistent with myocardial ischemia and findings on a 12-lead ECG. Acute heart failure (ACF) is a condition in which signs of heart failure appear rapidly and the patient’s symptoms are severe enough to require immediate medical attention. AHF

is a leading cause of hospitalization in individuals over the age of 65 and is associated with high mortality and rehospitalization rates. AHF can be new-onset or, more commonly, develop as a result of acute decompensation of chronic heart failure.(Warlow C ve ark., 2002)

7- Medication Management In Neurological Emergencies

Neurological symptoms constitute a significant portion of emergency department visits. Neurological disorders are conditions that require rapid diagnosis and treatment and can be life-threatening or lead to permanent neurological damage. The emergency department approach to such cases requires a multidisciplinary team and appropriate medication management. In neurological emergencies, after the initial evaluation, the patient should be stabilized and a diagnosis should be made quickly. A prompt neurological examination should be performed, imaging studies, and necessary laboratory tests should be planned. Then, the necessary treatment should be initiated quickly to prevent permanent brain damage.(Peery AF ve ark., 2021)

8- Medication Management In Gastrointestinal System Emergencies

Gastrointestinal (GI) emergencies constitute a significant portion of emergency department visits and can present with a wide variety of symptoms. The most common symptoms include abdominal pain, nausea, vomiting, diarrhea, and gastrointestinal bleeding. Abdominal pain, in particular, is a leading cause of emergency department visits. GI disorders are notable not only for their frequency of symptoms but also for their high mortality rates and financial burden on the healthcare system. GI emergencies encountered in the emergency department require rapid diagnosis and appropriate medication management. Drugs used in GI emergencies are categorized according to their mechanisms and clinical use. Acid suppressants, hemostatic agents, antibiotics, antiemetics, vasoconstrictors, analgesics, and fluid therapy are among the most commonly used drug groups in the emergency department. (Endokrin Aciller Kitabı, 2024)

9- Medication Management In Endocrine Emergencies

These are endocrine disorders that must be quickly recognized and treated in the emergency department, and which, if delayed, can lead to death or permanent disability. These conditions include hypoglycemia, ketoacidosis,

hyperosmolar nonketotic state, adrenal insufficiency, pheochromocytoma, myxedema coma, and thyrotoxic crisis.(Wiener CM ve ark., 2016) Hypoglycemia is a blood glucose level below normal that is associated with autonomic and neuroglycopenic symptoms. Because the blood glucose level at which patients with diabetes exhibit hypoglycemia symptoms varies, a self-monitored blood glucose level below 70 mg/dL, whether symptomatic or not, has been considered the level that should alert the patient or their caregiver to hypoglycemia.(Wiener CM ve ark., 2016) In non-diabetic patients, a plasma glucose level below 55 mg/dL, accompanied by clinical symptoms and improvement of symptoms with glucose levels, is considered hypoglycemia. Diabetic ketoacidosis (DKA) is a metabolic disorder characterized by ketonemia and ketonuria, resulting from insulin deficiency and severe hyperglycemia. This deficiency results in the metabolism's use of fatty acids as an energy source due to absolute insulin deficiency. It leads to high mortality if treatment is not initiated early.

10- Drug Management In Shock And Hypotension

Shock is a life-threatening condition that occurs when the tissues are unable to receive sufficient oxygen and nutrients. It typically presents with hypoperfusion, cellular oxygen deficiency, and metabolic disorders. It can develop due to various causes, including trauma, bleeding, severe infection, or impaired cardiac pump function, and is classified as hypovolemic, cardiogenic, obstructive, or distributive shock. If left untreated early, the resulting condition can lead to multiple organ dysfunction and high mortality.(Guyton A. C, Hall, J. E., 2016) The fundamental approach to shock management is to follow the ABCDE sequence to secure the airway, support respiration, stabilize circulation, assess neurological status, and monitor the patient holistically. Intravascular volume depletion should not be ignored, and if necessary, rapid crystalloid or blood product replacement should be administered. Vasopressor and inotropic agents can be initiated in patients unresponsive to fluid support. It is also crucial to quickly identify and address the underlying cause (bleeding, sepsis, cardiac ischemia, etc.). Shock management is made more effective with continuous hemodynamic monitoring, organ perfusion monitoring, and multidisciplinary collaboration. (Snyder L, Leffler, C. 2005)

11- Medication Management In Psychiatric Emergencies

Psychiatric emergencies are life-threatening situations that require timely and appropriate intervention. Medication management plays a crucial role

in calming the patient, controlling symptoms, and supporting long-term treatment planning in these emergencies. Proper medication management supports both the patient's clinical recovery and ensures the safety of both the healthcare team and the patient.(Royal College of Paediatrics and Child Health., 2021) Medication management in psychiatric emergencies requires a multidisciplinary approach and a treatment plan based on current clinical information. Medication selection and administration should be individualized according to the patient's condition. Proper medication management in psychiatric emergencies promotes rapid symptom control and long-term recovery. Future studies should focus on evaluating the efficacy and safety of new medications in emergencies.

12- Medication Management In Pediatric Emergencies

Every patient presenting to a pediatric emergency department should first be evaluated according to the ABCDE protocol. ABCDE Protocol A: Airway: The airway should be assessed, and if present, it should be quickly established. B: Breath: The rate, depth, and pattern of breathing should be assessed, and oxygen therapy should be initiated if necessary. C: Circulation: Heart rate, blood pressure, and capillary refill rate should be assessed rapidly, and fluid therapy should be initiated quickly if necessary. D: Diability: The level of consciousness should be checked, and the pupillary reflex assessed. E: Exposure: The body is checked for any injuries, bleeding, or other findings. The body temperature is checked. After evaluation according to the ABCDE protocol, each patient's vital signs, including pulse, respiratory rate, blood pressure, and fever, should be assessed. These signs should be evaluated according to age and gender. Alarm signs such as respiratory irregularity, signs of shock, loss of consciousness, severe trauma, anaphylaxis, signs of shock, petechiae, high fever, hypoglycemia, and hypotension should be reviewed. When necessary, emergency treatment for these conditions must be administered quickly.(Karakılıç) Pediatric drug doses are calculated based on body surface area or body weight. However, body surface area is not used to calculate drug doses in premature and neonatal infants. This is because infants have a greater body surface area relative to body weight than adults. Therefore, the drug dose calculated based on body surface area is greater than the dose calculated based on body weight. Safe drug doses vary depending on the child's age and ability to metabolize the drug. Before administering any medication, the correctness of the recommended drug dose based on the child's weight or body surface area is verified. In emergency situations, medication and fluid therapy management in children should also be tailored to the specific condition the child is experiencing

and its severity. For example, emergencies such as dehydration, shock, or toxic substance ingestion may require very different treatment approaches. In all cases, the treatment plan should be based on the child's general health and current clinical findings. Furthermore, ongoing monitoring and, when necessary, re-evaluation of medication and fluid therapy interventions is vital to the effectiveness and safety of treatment.

13- Drug Management In Toxicological Emergencies (Poisoning And Antidote Management)

The clinical approach to patients with potential poisoning begins with the identification and treatment of life-threatening conditions. Initial assessment should assess airway, respiratory, and circulatory problems (RBCs), and the patient should be stabilized. If trauma is suspected, a neck collar should be applied, and any objects in the mouth should be removed to secure the airway. In cases of airway compromise, such as loss of consciousness, particularly if the Glasgow coma score (GCS) is 8 or lower, endotracheal intubation should be performed without delay. Pulse oximetry and cardiac monitoring should be used to assess circulation, blood glucose levels should be measured, and, if necessary, fluid therapy should be initiated early. It should be kept in mind that even if patients are asymptomatic, their clinical condition can deteriorate rapidly. Close monitoring should be performed for possible central nervous system (CNS) and respiratory depression, dysrhythmias, and seizures. (Karakılıç E, ve ark., 2015)

14- Targeted Drug Management In Ent Emergencies

Ear, Nose, and Throat (ENT) emergencies encompass a range of clinical conditions that, if not addressed promptly, pose a significant risk of morbidity and mortality for patients. These emergencies are evaluated by emergency medicine specialists, general practitioners, pediatricians, and ENT specialists in adult and pediatric emergency departments.(Raj A. ve ark., 2019) Diagnosis and management of ENT emergencies must be prompt and should not be delayed. Delayed treatment can lead to serious complications, including upper airway stenosis, intracranial infections, and even death. For example, infections in the ear or nose can rapidly progress to intracranial complications due to their proximity to the brain.(Sreekanth G, ve ark., 2022)

15- Recommendations And Conclusions

Safe medication administration should adhere to the eight principles of correct patient, correct drug, correct effect, correct dose, correct route, correct form, correct time, and accurate recording. Written procedures, along with guidelines and checklists for administering high-risk medications, should be developed for the administration of IV fluids. In-service training programs should be organized for medication administration. Nurses should be aware of the therapeutic efficacy and safety of the administered medication, the safety precautions they can use when preparing and administering medications, and the legal requirements they must adhere to. They should also accurately record information regarding medication administration. By fulfilling these responsibilities, nurses will ensure that the medication provides the maximum benefit to the individual and minimize side effects. Patients should be monitored for potential medication side effects, their response to treatment should be recorded, and the dosage should be adjusted if necessary. The need for continued medication therapy should be reassessed, and unnecessary treatments or those whose risks outweigh their benefits should be discontinued.

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CHAPTER 15

A LITERATURE REVIEW OF NURSING THESES EXAMINING WOUND HEALING USING INTERVENTIONAL WOUND MODELS

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Hilal KAYNAK AYDOĞMUŞ[2]

Dilek AYGİN[3]

ABSTRACT

Objective: This study aims to examine, through a literature review, the interventions conducted to evaluate wound healing in experimental thesis studies in the field of nursing in Türkiye that employed interventional wound models.

Method: Graduate theses published between 2020 and 2025 in the Council of Higher Education Thesis Center (YÖK Tez Merkezi), which used experimental animals (rats/mice) and focused on wound healing, were reviewed. The agents used, wound models, evaluation methods, analyzed parameters, and findings were thematically classified.

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Results: The most frequently used animal models in the reviewed theses were Wistar Albino and Sprague Dawley rats. Excisional, incisional, burn, and infected wound models were applied; natural and technological agents such as lavender oil, clove oil, Plantago major, quercetin, propolis, styrax oil, vernix caseosa, hydrogen-enriched water, and cold plasma were used. Wound healing was evaluated using Walker score, ImageJ measurements, histopathological (H&E, trichrome), immunohistochemical (VEGF, EGF, IL-6, Ki-67), and biochemical (MDA, GSH) analyses. Overall, all agents supported healing, with some applications making significant contributions by reducing inflammation, increasing granulation tissue and collagen synthesis, and accelerating epithelialization.

Conclusion: Over the past five years, there has been an increase in the number of theses conducted by nursing researchers using experimental wound models. Natural agents and innovative methods have shown promising results in wound healing, and it is recommended that studies in this field be continued using standardized methodologies.

Keywords: wound healing, experimental animal, nursing.

Introduction

Wound healing is a complex biological process involving the stages of hemostasis, inflammation, proliferation, and remodeling. Systemic and local factors such as diabetes, malnutrition, infection, and inadequate tissue perfusion may adversely affect this process (Öztaş, 2021). Therefore, the development of new products that support wound healing, possess anti-inflammatory properties, promote angiogenesis, and accelerate epithelialization is among the priority research topics in the field of nursing. In recent years, there has been an increase in experimental studies investigating the effects of both natural agents (e.g., lavender oil, clove oil, propolis, quercetin) and innovative technologies (e.g., cold plasma, hydrogen-enriched water, TENS, gelatin-based nanofibers) on wound healing. These studies are generally conducted on rat models and evaluated using macroscopic, histopathological, immunohistochemical, and biochemical parameters. In this literature review, experimental studies in Türkiye that employed interventional wound models using laboratory animals in master's and doctoral theses completed in the field of nursing in recent years were systematically examined.

Methods

Çetinkaya's doctoral dissertation experimentally evaluated the effects of ketogenic and Western-type diets on pressure ulcer healing. The study included 33 male Sprague-Dawley rats, divided into three groups and fed standard, ketogenic, or Western-type diets. In the fourth week, a pressure ulcer was induced in all animals using a neodymium magnet. Throughout the diet period, body weight, height, BMI, cholesterol, and triglyceride levels were monitored, and IL-6 and Ki-67 levels were measured in the ninth week. Histopathological examinations on day 7 revealed more pronounced granulation, collagen accumulation, and inflammation in the Western-type diet group, while re-epithelialization was lower. By day 42, collagen accumulation had decreased, and the number of inflammatory cells and angiogenesis was lower in both the ketogenic and standard diet groups compared to the Western-type diet group. Overall, the Western-type diet was found to be the most effective in pressure ulcer healing, followed by the ketogenic diet (Çetinkaya, 2020).

Gülpak's doctoral dissertation evaluated the effect of lavender oil on wound healing in an experimental diabetic rat model. This TÜBİTAK-supported randomized controlled experimental study was conducted with 48 male Wistar Albino rats aged 4–5 months, with diabetes induced by streptozotocin. Three full-thickness wounds were created on the backs of the rats using a punch biopsy, and daily dressings were performed with lavender oil (0.5 ml), Madecassol (0.5 g), or physiological saline (0.9%). Wound healing was assessed macroscopically and microscopically using Walker's wound healing percentage, ImageJ for wound area calculation, hematoxylin–eosin (H&E) staining, and immunohistochemical staining (VEGFA, collagen-I, collagen-III). Findings showed that the lavender oil groups had the highest wound healing percentage and the smallest wound area measurements. Moreover, inflammation decreased, angiogenesis, granulation tissue formation, and re-epithelialization accelerated, and VEGFA, collagen-I, and collagen-III levels significantly increased. The lack of a significant difference between the Madecassol and lavender oil groups indicated that the efficacy of lavender oil in wound healing was comparable to that of the positive control (Gülpak, 2020).

Çelik Yılmaz's doctoral dissertation experimentally investigated the effects of styrax oil, propolis, silk protein, and Ankaferd on an excisional wound model. The study included 36 Balb/c mice, which were divided into four groups, and daily dressings with the respective agents for each group were applied to the excisional wounds created on their dorsal

regions for 14 days. Tissue samples were collected on days 7 and 14, and blood samples were obtained at the end of day 14 to biochemically and immunohistochemically evaluate healing indicators such as IGF, EGF, Ki-67, IL-6, and hydroxyproline. The groups treated with silk protein and styrax oil exhibited faster wound healing, and all agents were observed to support re-epithelialization, angiogenesis, and collagen synthesis. In the Ankaferd group, signs of inflammation were found to be more pronounced (Çelik Yılmaz, 2022).

Boyacıoğlu's doctoral dissertation evaluated the effects of transcutaneous electrical nerve stimulation (TENS) on histopathological changes and oxidative/antioxidant parameters in an incisional wound model created in diabetic rats. The study involved 48 male Wistar Albino rats divided into six groups; diabetes was induced with streptozotocin in the relevant groups, incisional wounds were created, and TENS was applied for either 3 or 7 days. Wound tissues were examined histopathologically and immunohistochemically, and oxidative stress indicators were measured in serum. Findings revealed that the group receiving 7 days of TENS showed a decrease in fibroblast and mast cell counts and angiogenesis, an increase in glutathione levels, and a significant reduction in malondialdehyde levels. VEGF and FGF levels were also found to be lower in the TENS-treated groups. These results demonstrated that TENS supports diabetic incisional wound healing and reduces oxidative stress (Boyacıoğlu, 2022).

Algım Atmaca's master's thesis examined the effect of vernix caseosa on wound healing in an incisional wound model. This experimental study, conducted at Atatürk University, involved vernix caseosa collected under sterile conditions from newborns delivered by cesarean section at 37–42 weeks of gestation, which was then applied to 56 rats. The rats were divided into four groups after creating an incisional wound model, and daily applications of vernix caseosa or Terramycin cream (for the control group) were administered to the wound sites for 7, 14, and 21 days. The wound areas were evaluated macroscopically, biochemically, and histologically on days 7, 14, and 21. Findings indicated that vernix caseosa increased connective tissue formation, shortened the epithelialization period, and significantly accelerated wound healing compared to the control group. The study demonstrated that vernix caseosa holds potential as a natural healing agent in wound care (Algım Atmaca, 2023).

Ersözlü's doctoral dissertation, conducted in 2024, evaluated the healing effect of atmospheric pressure cold plasma-activated water in diabetic wound care and aimed to compare this method with currently available standard

dressing products. The study, carried out at Karabük University DETUM, used 40 male Wistar Albino rats with induced diabetes; both punch and incisional wound models were employed. Different groups received isotonic dressing, hydrocolloid dressing, plasma jet, or plasma-activated water. Wound healing was assessed using macroscopic, histological, and biochemical methods. Results showed that in the group treated with plasma-activated water, wound size decreased significantly in the early period, epidermal thickness, collagen content, and hair follicle count increased, and total antioxidant levels were higher compared to other groups. These findings indicate that this method is effective in accelerating wound healing and should be considered for clinical research (Ersözlü, 2024).

Kahraman's doctoral dissertation investigated the effects of clove essential oil on wound healing and bacterial load in wounds infected with Staphylococcus aureus in diabetic rats. This randomized controlled study, conducted at Erciyes University, involved 81 Sprague Dawley rats divided into three main groups: healthy, diabetic, and diabetic-infected. Each main group was further divided into subgroups receiving olive oil, clove oil, or antibiotic treatment. Excisional wounds with a diameter of 6 mm were created, and treatments were applied for 14 days. Histopathological and microbiological analyses were performed on days 3, 7, and 14. Results showed that groups treated with clove oil had higher levels of granulation, collagen accumulation, and epithelialization, along with a significant reduction in bacterial load on days 7 and 14. The findings indicated that clove oil both supports wound healing and reduces infection (Kahraman, 2024).

Deniz's doctoral dissertation evaluated the effect of hydrogen-enriched water (HEW) on the healing of full-thickness excisional skin wounds. This experimental study, conducted at Kafkas University, included 38 Wistar Albino rats divided into diabetic and non-diabetic groups, with each group further divided to receive either HEW or physiological saline dressings. Wounds averaging 1.9 cm^2 were created, and daily dressings were applied for 14 days. Macroscopic, biochemical, and histopathological evaluations were performed on days 3, 7, and 14. Findings demonstrated that HEW application significantly increased wound closure rates, reduced TNF-α and IL-6 levels, and improved fibroblast and neutrophil density as well as epithelialization. Overall, HEW was found to accelerate wound healing, and the method was recommended for further clinical research in different patient populations (Deniz, 2024).

Özdemir Aslan's doctoral dissertation examined the effects of four different gelatin-based wound dressings on wound healing in rats with an experimentally induced diabetes model. Conducted as a randomized controlled trial, the study involved 42 Wistar Albino rats divided into six groups, comparing gelatin-based film, ointment, foam, and nanofiber wound dressings with physiological saline and control applications. Diabetes was induced in all groups using streptozotocin, and three wounds measuring 10 mm in diameter were created on the dorsal region of each rat. Dressings were applied for 21 days. Biopsy samples collected on days 0, 7, 14, and 21 were evaluated using hematoxylin–eosin and trichrome staining. Inflammatory cell infiltration, collagen and adipose tissue formation, angiogenesis, fibrosis, skin appendage development, and hair follicle growth were assessed. The findings revealed that the gelatin-based nanofiber wound dressing accelerated wound healing more effectively than other groups, with a particularly notable improvement between days 7 and 14. Morphological analysis showed that inflammatory cells, collagen, angiogenesis, and skin appendage formation were more prominent in the nanofiber group (Özdemir Aslan, 2024).

Keleş's experimental doctoral dissertation evaluated the effect of Plantago major (PM) extract on wound healing in diabetic and non-diabetic rats, compared with physiological saline. The study included 28 rats divided into four groups, with diabetes induced using streptozotocin and excisional wounds created on the dorsal region. Wound care involved the application of PM or physiological saline. By the end of day 14, the highest healing rate (97%) was observed in the physiological saline group, followed by the PM group (93%). PM partially reduced glucose levels in the diabetic group but increased inflammation. The results indicated that PM provided only limited support to wound healing and should be investigated further (Keleş, 2024).

Akarsu's doctoral dissertation aimed to compare the effects of quercetin and nitrofurazone on wound healing in diabetic rats. The study involved a total of 43 male Sprague Dawley rats, aged 75–90 days and weighing 250–300 grams, randomly assigned to four diabetic groups and one non-diabetic control group. Three circular excisional wounds, each measuring 10 mm in diameter and spaced 15 mm apart, were created on the dorsal region of each rat. For 21 consecutive days, the diabetic groups received daily dressings with either 0.5 g quercetin, nitrofurazone, or carboxymethyl cellulose (CMC). Wound healing was evaluated macroscopically on days 0, 7, 14, and 21 using Walker's wound scoring system and ImageJ software for wound area measurement. In addition, histopathological analyses were performed

on biopsy samples taken from all rats on day 21, and biochemical analyses of venous blood samples were conducted to determine EGF and IL-1 levels.

The results showed that the quercetin- and nitrofurazone-treated groups had significantly higher wound healing percentages and smaller wound areas compared to controls. In the quercetin-treated group, a reduction in inflammatory cell infiltration and edema was observed during the first week; angiogenesis, granulation tissue formation, and epithelialization were accelerated on days 7 and 14; and hair follicle and adipose tissue formation were promoted by day 21. A statistically significant difference in EGF levels was found among the groups. The findings of Akarsu's study indicated that quercetin and nitrofurazone positively affect wound healing through different mechanisms and accelerate tissue repair under diabetic conditions (Akarsu, 2025).

Table 1. Summary of Nursing Theses Conducted Using Interventional Wound Models

Author	Year	Title	Research Outcome
Çetinkaya	2020	The effect of standard, ketogenic, and Western-type diets on pressure ulcers in rats	Western-type diet was found to be the most effective, followed by the ketogenic diet.
Gülpak	2020	The effect of lavender oil on wound healing in rats with an experimental diabetes model	Lavender oil showed the highest wound healing percentage; produced a similar effect to Madecassol.
Çelik Yılmaz	2022	Comparison of the effectiveness of silk protein, propolis, styrax oil, and a hemostatic product on full-thickness wounds in mice	Silk protein and styrax oil achieved the fastest healing; inflammation was more pronounced in the Ankaferd group.
Boyacıoğlu	2022	The effect of transcutaneous electrical nerve stimulation (TENS) on incisional wound healing and oxidative stress in streptozotocin-induced diabetic rats	Increased fibroblast count and reduced oxidative stress were observed in the group receiving 7 days of TENS.
Algım Atmaca	2023	Investigation of the effect of vernix caseosa application on the healing rate in an experimental wound model in rats	Increased connective tissue formation and shortened epithelialization time.
Ersözlü	2024	Evaluation of the effect of atmospheric cold plasma application on wound healing in streptozotocin-induced diabetic rats	Wound size decreased, epidermal thickness and antioxidant levels increased.

Kahraman	2024	The effect of clove essential oil on *Staphylococcus aureus*-infected wound healing in diabetic rats	Increased granulation, collagen, and epithelialization; bacterial load decreased.
Deniz	2024	The effect of hydrogen-enriched water on healing of excisional full-thickness skin wounds in diabetic and non-diabetic rats	Wound closure rate increased, inflammation decreased, epithelialization accelerated.
Özdemir Aslan	2024	Examination of the effect of four different gelatin-based wound dressings on wound healing in an experimental diabetes model	Nanofiber dressing was the most effective; collagen, angiogenesis, and skin appendage formation increased.
Keleş	2024	Investigation of the effect of *Plantago major* (PM) on wound healing in experimentally induced diabetic and wounded rats	PM increased inflammation; healing rate was lower than physiological saline.
Akarsu	2025	Comparison of the effectiveness of wound care with quercetin and nitrofurazone on wound healing in a diabetes model in rats	Both agents supported healing; quercetin reduced inflammation and accelerated epithelialization.

Conclusion

This literature review demonstrated that experimental thesis studies in the field of nursing employing interventional wound models make significant contributions to the development of new agents and methods that support wound healing. The natural components and technological applications used in these studies enhance tissue regeneration and reduce inflammation. However, the positive outcomes obtained need to be supported by larger sample sizes, longer follow-up periods, and clinical research. From the perspective of the nursing discipline, such experimental studies enable the development of evidence-based practices for wound care and, through multidisciplinary collaboration, contribute to improving the quality of healthcare services.

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